the Army Space Journal

Fall 2002
Vol. 1, No 4

A Professional Journal for Army Space Operators
Published by U.S. Army Space and Missile Defense Command

Millennium Challenge 2002

Space Operations
A Growing Mission Area

We want you to know
This Journal's for you

I'm sitting here at my desk laughing, thinking about this magazine. But first, there's a hurdle. I remember Jim Lea, a great reporter who worked for Pacific Stars & Stripes from the early sixties.

For at least a brief time, every soldier or civilian stationed in the Pacific gets a touch of Jim Lea. He bylined articles from Vietnam, Japan, Okinawa and, finally, South Korea over that 30 year or so span. He wrote about soldiers. Mostly, he cared about them —- and not just soldiers. His was an audience that spread across the Department of Defense services and ranks. His headlines were far too many to recall, but if you've passed through the region and experienced a cup of coffee with the newspaper there, you've gotten a touch — an emotional tug — from Jim Lea.

My introduction to this hard-nosed, get-the-facts-straight, say-what-it-is-because-the-readers-deserve-it kind of guy came in the mid-eighties. It was in a Tokyo restaurant that the intimidating Jim Lea looked across the table at timid me, telling me it was okay to eat the moving, squiggly things on the plate. Over the following years as mentor to a young inexperienced journalist, he showed delicate care guiding me to get-it-right journalism — the same as when he helped me take my first step to eating live foreign cuisine.

He wasn't always kind. For me, his touch often quickly transitioned from a calm quiet request to re-write a portion of an article to a blunt slap on the head demanding a total rewrite. "What the hell are you trying to say in these tortured sentences of yours?" I can still hear him scream. What this politically incorrect civilian journalist taught me though — beyond the words, the thought process for presenting facts, the nose for news — was this: You can show your concern for the soldiers and sailors and Marines and airmen who work and live in the trenches by what and how you write.

So now, as I sit with this stack of journal articles assembled here as the latest edition of the Army Space Journal on my desk, I'm wondering what Jim Lea would say. Following his well-practiced form, I think he'd ask his typical gruff questions — recognizing the ASJ is a professional journal and already knowing the answers — who is the audience, what is the point, who cares?

Then, before the answers start, he'd lecture me. Which causes me to say: The Journal provides a voice for Army Space Operations Officers and others involved in the business of Space operations. Through their contributing articles and letters — written in their language — they share lessons learned, build doctrine, and foster a sense of community throughout the Army. "Tip of the Sphere" adds to the effort with a focus on people.

Say what? Jim Lea would reply, just like he did to a young reporter learning the ropes a long time ago. At those words, I would always know that he was giving me a guarded approval to print with a string attached — a string that is important even with this fourth edition of the revised ASJ about finished. That was the enduring lesson that Jim Lea taught: Always work to get it right, check to see what you say you're doing is what you are actually doing. Even after you're done and gone to press, work hard to write your next story — print your next publication — better.

So I'm being prodded by my memory of Jim Lea — as any managing editor ought to be — to find out if we're meeting the needs of the readers, the troops in the trenches. The next edition's theme is "The Role of Space in Army Transformation" and it picks up from where MC02 leaves off. We will examine the Objective Force and try to figure out how we are going to integrate the exploitation of Space into land force operations. With that in mind, let us know what you think. To pass the Jim Lea muster, we need and welcome your contributions. We would like to print your articles and, from readers who want to discuss other articles or share experiences, letters.

By the way, Jim Lea died the other day near Seoul.

News came to me in the midst of these deadlines. Typical Lea. That's why I'm laughing — not irreverently, mind you. It's because seeds of Jim Lea, faint as they may be, are in this magazine. I hope you can see them.

— Managing Editor

the Army Space Journal

Fall 2002 Edition

Contents

Approval: The Commanding General, U.S. Army Space and Missile Defense Command, has determined that the publication of this periodical is necessary in the transaction of the public business as required by law. Use of funds for printing this publication has been approved by the Commanding General, January 2001, in accordance with AR 25-30.

Mission: The Army Space Journal is published quarterly by the U.S. Army Space and Missile Defense Command. The journal provides a forum through which Space Operations Officers can disseminate professional knowledge and furnish information within the U.S. Army. The purpose is to increase the effectiveness of Space operations through a professional discussion of events and lessons learned. It is also intended to inform the Army warfighter on Army Space initiatives.

Commanding General:
LTG Joseph M. Cosumano Jr.

Deputy Commanding General for Research, Development & Acquisition:
MG John M. Urias

Deputy Commanding General for Operations:
BG Richard V. Geraci

SMDC Public Affairs Officer:
William Congo

Managing Editor:
Michael L. Howard

Contributing Editors:
Donald Montoya
MAJ Laura Kenney
Richard Burks
Marilyn White
Jeff Welch
Brian Hermes

Graphics Editor:
Sharon L. Hartman

Comments, inquiries and manuscripts should be sent to the Director, Force Development and Integration Center (FDIC), ATTN:
Richard Burks
1330 Inverness Dr., Suite 440
Colorado Springs, CO 80910
Telephone: 719-622-2902
Fax: 719-622-2951
richard.burks@arspace.army.mil

Distribution to Functional Area 40 officers and associated military officers, civilians, and contractors. Changes to addresses and requests for this publication should be made to the FDIC address listed above.
http://armyspace.army.mil/SpaceJournal

Cover: Top right photo from OPERATION ENDURING FREEDOM taken by SPC Kelly Burkhart; bottom left photo by unit reporter, SGT Christopher Foster, B Co., 1st Satellite Control Battalion. Foster took the picture while attending the Primary Leadership Development Course at Fort Campbell, Ky.

Space — a Continually Growing Mission Area

LTG Joseph M. Cosumano Jr., Commanding General, United States Army Space & Missile Defense Command/Commanding General United States Army Space Command.

By LTG Joseph M. Cosumano Jr.

In 1949, American pioneer computer scientist Dr. John von Neumann stated: "It would appear we have reached the limits of what is possible to achieve with computer technology, although one should be careful with such statements; they tend to sound pretty silly in five years." Were he around to see the power of today's computers, I am sure he would agree that the latter half of his statement was prescient. In a similar vein, any suggestion that perhaps we have reached the limits of what is possible to achieve with Space-based capabilities would be met with a more seasoned disbelief today.

Our first "militarily-useful" satellites were put into orbit around the Earth in the early 1960s for surveillance and reconnaissance of our Cold War rival — the former Soviet Union. Shortly thereafter, we began launching communications and navigation satellites, followed by collection systems for signals intelligence. During the Cold War era, our Space efforts primarily concentrated on the pre-conflict aspects of general nuclear war and the military competition in Central Europe.

Beginning in the 1990s, the U.S. military sought to redirect its Space efforts toward the real-time enhancement of ongoing, non-nuclear military operations within the Earth's atmosphere. Many of our successes in the 1991 Persian Gulf War must be attributed at least in part to DoD's increased use of Space capabilities to enhance terrestrial operations — extensive use of military and civilian communications satellites for both inter- and intra-theater command and control as well as long-distance communications; imagery satellites for enemy order-of-battle information, target intelligence and bomb damage assessment following coalition air strikes; electronic intelligence and signal intelligence satellites to establish Iraqi electronic order-of-battle and to monitor such things as Iraqi air defenses and military communications; digital signal processing satellites for early warning of ballistic missile attack; and global positioning systems to help us navigate across the trackless desert and guide our precision munitions.

Today, in all our military operations — to include the ongoing Global War on Terrorism — we rely even more heavily on our Space-based systems to provide the situational understanding and communications needed to succeed at all points along the spectrum of operations. However, I think we have only just begun to truly leverage all that Space can do for us as a military.

The ultimate goal of Army Transformation — the Objective Force — will consist of lighter but highly lethal, mobile, and survivable formations that arrive in an area of operations ready to fight and fully synchronized with other elements of the Joint Force. Our successful transformation to the Objective Force will depend to a great extent on our ability to develop and operationalize new and improved Space-based capabilities. As a Space-empowered force, the Objective Force will routinely exploit the overhead constellation of national, commercial and military Space platforms for intelligence, focused surveillance, and area reconnaissance; long-haul communications; early warning of missile attack; positioning, timing, and navigation; missile defense; and access to the Global Information Grid. The infusion of Functional Area (FA) 40 Space Operations Officers into Army Forces and Joint headquarters will further ensure current and future Space force enhancement tools and products are integrated into Objective Force operations.

What exactly the Objective Force will look like is not yet certain. We know it will be a Space-empowered military force able to deliver precisely calibrated effects, from taking a picture to dropping a precision munition, at any time and anywhere on Earth. Beyond the Objective Force? Perhaps we will have large Space planes ferrying troops, supplies, and munitions to their Space stations in orbit, ready to go anywhere within minutes or hours rather than days and weeks. This Space-based force might have at its disposal lasers, particle beam weapons, focused electromagnetic pulse devices, and a variety of kinetic energy devices. Operations may include Space-to-Space and

Today, in all our military operations — to include the ongoing Global War on Terrorism — we rely even more heavily on our Space-based systems to provide the situational understanding and communications needed to succeed at all points along the spectrum of operations.

Space-to-ground engagements.

What is certain is the miniaturization of technology will allow us to place more capabilities on our Space-based systems, to include on-board processing and a greater variety of sensors. I think there will soon be a time when we will be able to look anywhere on Earth at any time — in all weather conditions. We will be able to "see" things hidden under camouflage, inside structures, and even below the surface (both water and land). We should also, from Space, be able to detect and track objects moving on the ground. Space-based intelligence, surveillance and reconnaissance, combined with rapid global communications and high-speed information processing, will give us the ability to find, fix, track, and target anything of significance, worldwide. In the future, there literally will be no place to hide.

The computing power of yesterday's room-sized mainframes can now fit on a single computer chip. We can foresee the eventual replacement of our Space-related intelligence, communications, and early warning ground stations by software programs embedded in military equipment itself and found at lower user levels, much like global positioning system receivers today. This will reduce our footprint in-theater and support our vision of a lighter, more deployable and more tactically agile force. This evolutionary process has already begun with our fielding of the Tactical Exploitation System (TES). This single system combines all Tactical Exploitation and National Capabilities functionality into a single, integrated, scalable system designed for split-based operations. Division-TES will take us down to a single HMMWV-mounted system, and our plans call for the entire functionality to eventually reduce to an easily updated or reconfigurable software package that will reside within the Army's Future Combat System.

Future warfighters will expect Space support on demand. The miniaturization of Space-related capabilities, the replacement of large, cumbersome ground stations with software programs, and the on-board processing of data by Space-based systems, will go a long way toward allowing direct two-way links between Space-based assets and the individual warfighter. Data requests will go straight from the computerized soldier to the Space-based platforms, and filtering algorithms will allow him to select only the data he needs so he isn't overwhelmed. The warfighter will be able to change those filters as his requirements change so that he gets the information he needs when he needs it.

Space-based blue force tracking capabilities, beginning now with Grenadier BRAT (beyond line-of-site reporting and tracking), will allow the warfighter to always know where he and other friendly forces are. This will greatly reduce the potential for fratricide, as weapons will be programmed to not fire at targets identified as "friend." Conversely, as demonstrated in Operation Enduring Freedom, we are already enabling the warfighter to pinpoint an adversary's location via triangulation with Space-based systems, and immediately call for fire via his personal satellite communications link. I think it is inevitable that we will eventually position weapons in Space, immediately available for attack of terrestrial targets. And we can expect to have in-orbit battles to gain and maintain control of Space — just as we have battles in the air, on land and on and under the seas. As mentioned earlier, I think we have only scratched the surface of what Space can do for us as a military.

The President's National Security Strategy, released in September states: "Innovation within the Armed Forces will rest on experimentation with new approaches to warfare, strengthening Joint operations, exploiting U.S. intelligence advantages, and taking full advantage of science and technology." Through experiments such as Millennium Challenge 2002 (conducted from July 24 to August 15), we are able to demonstrate and assess the "values-added" of innovative capabilities and new operational concepts. Several Space-based capabilities were included in MC02

(See Mission Area, page 44)

MC02 — Normalizing Army Space: Key to Supporting Joint Operations

BG Richard V. Geraci, Deputy Commanding General for Operations, United States Army Space & Missile Defense Command/Deputy Commanding General, United States Army Space Command.

By BG Richard V. Geraci

United States Space and Missile Defense Command participated in Millennium Challenge 2002, the largest, most complex military experiment/exercise ever staged, from July 24 to Aug. 15. It involved 13,500 soldiers, sailors, airmen, and Marines operating in 26 locations. The exercise combined computer simulations and live military activity directed through two headquarters, one in Suffolk, Va. and the other in San Diego, Calif. Joint Forces Command (JFCOM), which leads Department of Defense Joint experimentation, was responsible for the overall experiment.

JFCOM's overall objectives were to test, experiment, and validate concepts, technologies, and doctrine for future Joint operations. Of particular emphasis was the investigation of Effect-based Operations (EBO.) EBOs are designed to quickly exploit the weaknesses of an adversary's political, financial, civil, and military infrastructure, using all elements of national power to essentially neutralize their ability to wage war. Significant to achieving this is linking together the Services' individual information, command, communications, and operational capabilities in a Joint environment. These capabilities, whether supplied by air, land, sea, or Space assets, must be integrated and mutually supportable to advance force transformation. MC02 covered the whole spectrum of military operations from counter-terrorism to major theater war and incorporated lessons learned from Operation Enduring Freedom.

SMDC had three objectives: to investigate and document any dependency or vulnerability of "Rapid Decisive Operations" upon Space and missile defense; to identify any new Space and missile defense doctrine, training, leader development, organization, materiel, and soldier (DTLOMS) recommendations for the Objective Force; and to continue to normalize Space in Army operations, specifically when operating in a Joint environment.

The articles in this issue of the Army Space Journal highlight comprehensive Army Space participation in MC02 and the many lessons learned. In general, education and training continue to be paramount in maximizing Space-based capabilities. There are some other specific observations that I would like to emphasize.

First, noteworthy was the overall extent and character of Army Space play in MC02. Four of the 11 Army initiatives were sponsored by SMDC, and SMDC's Army Space Program Office (ASPO) made a significant contribution to the Joint intelligence, surveillance, and reconnaissance initiative. These initiatives were the result of focused efforts and technological advancements made by the Space and Missile Defense Battle Lab, Army Space Command, and ASPO personnel. The planning and execution of the initiatives highlighted the unique capabilities of the command to support Joint warfighters, as well as the Army's significant use of Space-based capabilities to conduct decisive operations. Our participation in MC02 underscored the

In MC02, we demonstrated that Space capabilities contribute to literally every aspect of Army operations and emphasized the fact that we need to invest more time, effort, and budget into Space, balanced with other Army capabilities. As proponents for Objective Force capabilities vie for funding, it is important that they understand Space as a key enabler to Army capabilities.

importance of experimentation, and that to be relevant, we must remain active in future Joint experimentation. Lessons learned will cause adjustments to our support to our current forces (e.g., Army Space Support Team modernization.) We also gathered insights that will guide refinements to our work in designing Space support for the Objective Force.

The work at SMDC and Army Space Command centered on supporting the effects-based planning and operations of the Army Forces as part of a Joint operation. Army Space Command and Space and Missile Defense Battle Lab's Space Division deployed 33 soldiers and civilians, including a complete Space Support Element (SSE) to the Army Forces headquarters — the 82nd Airborne Division at Fort Bragg, N.C. The Battle Lab also supported the 32nd Air and Missile Defense Command (AAMDC) with the Future Operations Capability/Tactical Operations Center at Nellis Air Force Base, Nev. ASPO provided Joint simulation support from Navy's Fleet Center Pacific in San Diego, Calif.

We gained new operational perspectives by integrating our processes and products into the larger, more comprehensive Joint operation. In MC02, we demonstrated that Space capabilities contribute to literally every aspect of Army operations, emphasizing the fact that we need to invest more time, effort, and budget into Space, balanced with other Army capabilities. As proponents for Objective Force capabilities vie for funding, it is important that they understand that Space is a key enabler to Army capabilities. Space is not free, and its greatest cost is exacted in terms of other Army capabilities that may be set aside to fund Army Space. Experiments such as MC02 are important venues to investigate and demonstrate its value in relationship to other operational capabilities. Every soldier and piece of equipment must contribute significantly or risk being displaced by other, more effective capabilities. Space assets taken into the area of responsibility require basing, protection, supply, etc., so they must substantially contribute to Army Forces mission accomplishment. MC02 showed that Space expertise and Space-based capabilities have a key role in enabling the Objective Force as a part of Joint operations.

Army Space experiments in MC02 were highly successful. ASPO's efforts highlighted the value-added of the Tactical Exploitation System and its sister-service replicas. The Future Operations Capability/Tactical Operations Center that supported the 32nd AAMDC demonstrated that fusion of information can significantly reduce the force's footprint. With this capability, 32nd AAMDC was able to conduct operations and participate in a collaborative planning process in a footprint 50 percent smaller than the one currently fielded. The Battle Lab's TacSpace initiative showcased a significant capability to the Army Forces. This initiative was designed to address Space support to the military deci-

(See MC02 — Normalizing Army page 42)

The View From (Army) Space ...

Full Spectrum of Space Operations

By COL Glen C. Collins Jr.

The theme for this issue of the Army Space Journal is Space Operations. Operations are the meat and *raison d'être* (for those of you who don't speak French, this means reason for living) of any organization, and in Space and for those who function in it, things are no different. Operations are what it's all about.

Headlining this issue are the Army contributions to the Joint Forces Command Exercise Millennium Challenge 2002 (MC02). This was the largest Joint experiment ever executed, testing new warfighting concepts developed over the crucible of the past few years.

Our specific part in that massive undertaking was the Army Transformation Experiment 02, an exercise that let us look down the road toward the Objective Force. As an experimental platform, it permitted us to assemble some tools that we anticipate using in the future and to see more clearly the direction we are going in Space in the near term.

The articles assembled in this issue detail some of those successes, with their focus on Operations. They begin the dialogue to field new organizations and capabilities, and they let us ponder what the future has to offer. This is the first of three editions whose themes will take us further down the road in Space.

In this Journal, you'll see many articles describing both the challenges and triumphs of MC02. GEN B.B. Bell, who acted as Joint Task Force Commander for Task Force Blue in that exercise, comments on the emerging doctrine of Effects-Based Shaping. Another article sights in on Ulchi Focus Lens 02. Battle captains tell tales from the field, demonstrating how problems are worked out at the ground level, even when the target is the skies. The high-tech "foxhole" of the Army Space Operations Center is definitively defined. Soldiers out there performing missions send in their stories from around the globe. The full spectrum of Space operations is addressed by every level of operative.

The concepts, organizations, and equipment provided by Army Space Force into MC02 are all important contributions to Army Transformation. The Space Support Element (SSE) is the Objective Force link to its Space support, and link to our Space Home Station Operations Center, the ARSPOC. SSEs will be in legacy and Objective Divisions, Corps, and Numbered Armies, with fielding to begin around FY 05. The new Satellite Communications and command and control systems used in the SSE also offer exciting new capabilities to forward deployed Space Operations Officers.

As in all exercises, we are credited with many successes and have been provided a fair share of problems that still need to be pondered and analyzed. There are also many issues that have been analyzed and included in an ever expanding list of lessons learned which is, of course, accompanied by a growing list of things that need to be done.

We have, for example, uncovered areas that lack approved Space doctrine, discovered Space support functions that need to be fleshed out, and identified a greater responsibility to educate and expand staff understanding of Space capabilities.

SGT Brandi Harris, from Army Space Command's 1st Space Battalion looks over satellite images taken during Millennium Challenge 2002, in Fort Bragg, N.C.

PHOTO BY DEBRA VALINE

Similarly, a shortfall might be found in that, even today, many in the military are not aware of the many benefits Space can provide the warfighter, with the result that our facilities were sometimes under-exercised. The old adage of "advertise, advertise, advertise!" might apply.

Initially, information operations were not considered a focal point in the early stages of planning for MC02, but that changed very quickly due to the emphasis by the staff of the Joint Task Force Command.

But this is just the tip of the iceberg -- and for all the problems that we have uncovered, there are many more yet to be discovered. Good ideas are our stock in trade and if we are to succeed in solving these problems and accomplishing our tasks, we need to tap into the well of knowledge and experience that exists out there. We need assistance and feedback from the field. Which is where you come in, both the authors already writing for this fine publication, and for those reading. Give us feedback!

Speaking of feedback ... recently I handed a copy of our Army Space Journal to an Air Force Space Officer. (Advertising!) He read it and told me the next time we met, "We have nothing like this in the Air Force!" Yet another milestone in our friendly 'competition' which began with the Army being first in Space…

Effects-Based Shaping and Decisive Operations

GEN B.B. Bell, previous commander III Corps and Fort Hood, Texas, and now the Commanding General U.S. Army Europe and 7th Army, served as the Joint Task Force Commander for TF Blue during Millennium Challenge 2002. As a combatant commander with extensive experience during Operations Desert Shield and Desert Storm, and in Operation Joint Endeavor in the Balkans, his perspective on current operations is invaluable. Additionally, his service as a planning officer for the Joint Chiefs of Staff and as an analyst for Army DCSOPS uniquely suit him to see the big picture. He wrote the following article on emerging doctrine concerning Effects Based Operations for the Army Aviation magazine, and it is reprinted here with permission.

By GEN B.B. Bell

There is healthy doctrinal tension among warfighting professionals regarding the emergence of Effects-Based Operations (EBO). One major source of this tension involves implications for the doctrinal concepts of task and purpose, and the decisive/shaping/sustaining (D/S/S) construct. The Army embraces our doctrine of Task and Purpose and D/S/S like parents love their kids, and that's good because it works. We are all, therefore, justifiably hesitant to pursue the EBO concept without further experimental rigor. This professional concern is healthy. But, it may be unwarranted. Here's why — Effects-Based Operations can and should retain the concept of tasks such as defeat and destroy. More importantly, EBO should hold subordinate units accountable for achieving them and their associated purpose through both shaping and decisive operations. EBO can add clarity to task and purpose and is supportive of, rather than contrary to, D/S/S.

EBO was a hallmark experimental objective of the recent Joint experiment, Millennium Challenge '02. During the experiment the approach was found to have merit for further concept development and, while it needs refinement, EBO will most likely find its way fully into our joint doctrine in the near future. The following definitions are necessary to lend clarity:

Effect — A physical, functional, or psychological outcome, event, or consequence that results from military or non-military actions. An effect is expressed in terms of an adversary's behavior. (Rapid Decisive Operations v. 2.0, JFCOM).

Effects Based Operations — A process for obtaining a desired strategic outcome through the creation of effects by the synergistic application of the full range of military and nonmilitary capabilities at the operational level. (Rapid Decisive Operations v. 2.0, JFCOM).

The bottom line is described as follows:
Seize Hill 821 [1] Effect Enemy no longer occupies Hill 821 = Effect

In layman's terms, and at the risk of oversimplification, an effect provides a needed quantification of pur-

PHOTO BY SPC ERIC E. HUGHES, U.S. ARMY

Millennium Challenge 2002 successfully tested the ability of U.S. Joint Forces to conduct rapid decisive operations in the near future. These operations will assist warfighters with many of the situations they currently face. Left: Members of the 108th Military Police Company, 503rd MP Battalion, Fort Bragg, N.C., position a tactical satellite communication terminal next to a High Mobility Multi-Purpose Wheeled Vehicle to relay information about the Albanian and Serbian protest near the town of Domerovce, Kosovo. After two Serbian men disappeared, Serbians believed Albanians abducted the men and made threats and road obstructions to prevent safe travel through town for Albanians. Albanians began to form a mob to confront the Serbians until U.S. and Russian KFOR troops made a wall between the opposing sides on Aug. 15, 2000.

pose in terms of the enemy. As an example:

An enemy independent armor brigade is acting as the reserve for a defending division tactical group. The U.S. commander determines that this brigade is to be the target of his shaping operation because it threatens a planned penetration. Today, the commander would tell his Deep Operations Coordination Cell (DOCC) to defeat or destroy the brigade (task) in order to prevent it from counter-attacking penetrations of the enemy's main defense (purpose).

However, under the EBO concept the commander would tell his Effects Coordination Cell (ECC) to destroy the brigade (task) in order to prevent it from reinforcing penetrations of the enemy main defense (purpose), and assign an effect or effects to be achieved as follows: Enemy armor brigade is unable to place direct fires or observed indirect fires on friendly forces penetrating the enemy battle zone.

As the example illustrates, task and purpose remain relevant. The question then becomes, why do we need effects? Effects provide additional flexibility to a commander, while ensuring the application of combat power is most efficient and precise.

By prioritizing desired effects, the commander is able to rapidly concentrate relevant lethal or non-lethal combat power, and quickly shift from one priority to another. The commander can also better assess the mission by using effects to measure performance (are we achieving the desired effect?) and effectiveness (is an achieved effect producing the desired result?).

Additionally, subordinate commanders are provided increased freedom of action. In the above example, assume the brigade in question moved on its own away from the friendly force point of penetration and is no longer positioned to rapidly counter-attack. Most commanders given only task and purpose would pursue and attempt to destroy the brigade to eliminate the possibility of failing to achieve the stated purpose. Those same commanders, armed with a desired effect, would recognize that the enemy no longer threatens friendly force penetration and thus have the freedom to direct shaping assets to a higher priority effect such as the enemy IFC or command and control capabilities.

Bottom line — In this case, enemy decision-making and subsequent actions were central in helping us achieve our purpose and effect. In this environment, EBO empowers the commander to shift combat power to other priority missions.

Now that we have related task and purpose to EBO, we can examine the relationship between the FM 3.0 capstone concepts of decisive and shaping operations,

(See Effects-Based Shaping, page 42)

Millennium Challenge 2002

By Kurt C. Reitinger

Millennium Challenge 2002 (MC02) was a congressionally mandated, Secretary of Defense-directed, U.S. Joint Forces Command-sponsored large-scale Joint field experiment with live exercise components and demonstrations. The MC02 experiment execution dates were Jul 24 - Aug. 15, 2002. The purpose of the MC02 events was to demonstrate and assess the ability of the Joint Force to conduct rapid decisive operations in this decade. MC02 was a distributed, live, virtual, and constructive event that incorporated elements of all military services representative of their critical future force capabilities at the operational and tactical levels of war.

The majority of MC02's live events occurred in the Western Ranges Complex (Fort Irwin/National Training Center, Nellis, Air Force Base, Twenty-Nine Palms Marine Corps Base, and Naval Pacific Western Ranges).

Army Transformation Experiment 2002 (ATEx02) was the Army's embedded Service experiment within MC02. ATEx02 showcased the key role that an interim Army force can play in expanding the ground component and Joint Force commander's abilities to seize the initiative, maintain momentum, and exploit success at the tactical, operational, and strategic levels. ATEx02 explored the hypothesis that if Land Component Commanders are provided a transforming Army force that employs advanced enablers across doctrine, organization, training, materiel, leaders, personnel, and facilities, then they will have enhanced capabilities to dominate and force early termination through rapid decisive operations with full spectrum dominance.

Scenario

MC02 used a challenging anti-access scenario in the 2007 timeframe, providing the context for a U.S. Joint Force to conduct military operations (including decisive combat operations) in a crisis situation. The operational setting was intended to portray a "high-end small-scale contingency," with potential for escalation to a major theater war. The scenario was structured to highlight, explore, and shape the definition of potential warfighting concepts, to shape the conduct of future experimentation efforts, and to achieve MC02 objectives.

The actors involved as active nation States in the scenario included the threat country of REDLAND, the neutral and aggression-recipient country of GREENLAND, several neutral nation States (BROWNLAND, MAROONLAND, PURPLELAND, TANLAND, and GREYLAND), and the United States as the BLUE forces operating in the context of a Joint Force-established command. The operational scenario depicted the use of forcible entry and early entry forces operating in a Joint maritime, air, and ground environment to conduct rapid decisive operations.

As a result of its domestic instability, REDLAND's authoritative control was turned over to the military, which altered the State's national command authority and military leadership. The Southern Commander began a series of aggressive actions clearly acting outside the Red National Command Authority's policies and objectives. The Southern Commander was a hard-line nationalist and fundamentalist, while the National Commander was a modern pragmatist. The Southern Commander initiated occupation of disputed regional territories, expanded the Red National Command Authority's regional zone of influence, and instituted a "security toll" for transit shipping through its zone of influence. The United Nations condemned the actions of the Southern Commander, but refused to sanction military intervention. Concerned about its survival as a nation and wishing to join the community of world nations opposed to terrorism and aggression, the Red National Command Authority did not interfere with the United States conducting rapid decisive operations to prevent the Southern Commander from destabilizing the region and the world economy.

The scenario was structured to highlight, explore, and shape the definition of potential warfighting concepts, to shape the conduct of future experimentation efforts, and to achieve MC02 objectives.

The United States, having significant interests in the region, authorized military intervention to restore regional stability.

SMDC Participation

More than 50 U.S. Army Space and Missile Defense Command personnel provided Space and missile defense support in multiple continental United States locations throughout the experiment. Space and Missile Defense Battle Laboratory (SMDBL) and Army Space Command personnel supported the Army Forces headquarters at Fort Bragg, N.C., with the Space Support Element (SSE). The SSE was an integrated member of the Army Forces staff conducting effects-based planning. SMDBL personnel supported the 32nd Area Air and Missile Defense Command at Nellis Air Force Base, Nev., with the Future Operations Capability/Tactical Operations Center. 32nd Area Air and Missile Defense Command personnel operated SMDBL equipment to develop required products using the advance warfare environment architecture. Army Space Program Office personnel operated the tactical exploitation of national capabilities multiple unified simulation environment (TENCAP MUSE) in San Diego in support of the Joint simulation. TENCAP MUSE provided U-2 mission plans as well as U-2 and Global Hawk imagery into the simulation play via the virtual network. Army Space personnel served as Space and Information Operations Element team members at the Joint Task Force in Suffolk, Va., and at the Joint Force air component command at Nellis Air Force Base. Some of these activities are highlighted in this edition of the Army Space Journal.

Kurt Reitinger is an experimentation manager for the Space and Missile Defense Battle Laboratory's Space Directorate in Colorado Springs, Colo. Prior to his retirement from the Army in 2000, he served as the Director of Space Familiarization courses, including the Interservice Space Fundamentals course. He also served as Chief of Army and Navy in-theater missile warning with the Joint Tactical Ground Station.

Small Army Space contingent providing huge impact to field commanders

By Debra Valine

FORT BRAGG, N.C. (July 31, 2002) — From an area barely larger than the back end of a long-bed pickup truck, SPC Sabrina Bannister and fellow members of Army Space Support Team 5 from Colorado Springs, Colo., are providing Space-based capabilities that enhance commanders' views of the Millennium Challenge 2002 battlefield at the National Training Center at Fort Irwin, Calif.

Bannister, the network administrator, and the group of 11 civilians and 14 soldiers from Army Space Command operate and support the Space Support Element (SSE). While only a small number of people compared to the 13,500 soldiers, sailors, airmen and Marines participating in the three-week-long Joint training experiment, the team is making a huge contribution through the use of leading-edge technology.

The SSE is providing support to the Army Forces headquarters element — the XVIII Airborne Corps' 82nd Airborne Division — as part of the Army Transformation Experiment 02, the Army's contribution to Millennium Challenge. The capabilities of the SSE allow warfighters access to Space planning tools and enhanced commercial satellite imagery.

"The SSE is a one-stop shopping source for Space-based capabilities," said BG Richard V. Geraci, the Army Space Deputy Commanding General. "MC02 is the driver for getting our next seven year's worth of work. Success will be determined by how well the SSE concept is received. The existence of the SSE mitigates risk."

While most of the U.S. Army Space and Missile Defense Command's involvement is at Fort Bragg, substantial support is also being provided at Nellis Air Force Base in Las Vegas, Nev., where the Future Operations Capability/Tactical Operations Center is located. The Army Space Program Office is also providing simulation support at the Joint level to all services from the Navy's Fleet Center Pacific in San Diego, Calif.

SMDC objectives for the exercise include highlighting the criticality of Space and missile defense in Rapid Decisive Operations and Army Transformation, as well as continuing along the path to normalizing Space. A third objective is identifying Space and missile defense Doctrine, Training, Leadership, Organization, Materiel and Soldiers (DTLOMS) solutions for the Objective Force.

"We're excited to have the opportunity to demonstrate the importance of Army Space support in a Joint experiment," said LTC Brad Baehr, officer in charge of the

(See Field Impact, page 45)

Space is in the Eye of the Beholder…

By LTC Brad Baehr

The following is an FA40's view on the integration of the Space Support Element into an Army division during Millennium Challenge 02.

Background

It all started back in the summer of 2000 with the Joint Contingency Force Advanced Warfighting Experiment (JCF-AWE) conducted at the Joint Regional Training Center (JRTC) at Fort Polk, La., and Fort Bragg, N.C. In addition to the experimental initiatives showcasing the newest Space-based technologies and systems such as the tactical exploitation system, the en route mission planning and rehearsal system, and the mobile processing exploitation and dissemination system, there was one non-technology concept accepted into the experiment: a single Space Operations Officer — Functional Area (FA) 40.

The Space Operations Officer worked in the Division Assault Command Post and provided Space expertise to the division staff and commander. The lessons learned and observations from this experiment resulted in the development of an FA 40 tactics, techniques, and procedures (TTP). But there was more. The door had opened like the proverbial "camel's nose under the tent flap" for Space operations at other than corps level. This baseline of insight and knowledge was the point of departure for future Space operations and Millennium Challenge 02 (MCO2).

MC02 planning began in October 2000 following the JCF-AWE. Critical to MC02 was the expansion of Space operations at echelons other than corps. With the advent of the Army's Interim Division design effort and the formulation of a Space operational and organizational plan for the design, the experimental linchpin for MC02 was firmly in place.

The cornerstone for an expanded relevant Space presence was the Space Support Element (SSE). Think of the SSE as "Space central" for the division. Manned by multiple FA 40s and two highly trained noncommissioned officers, the SSE provides in-depth Space analysis, planning, and product development. The SSE has two parts: the Space toolset and the supporting infrastructure (e.g., HMMWV, Alaska tent, etc.).

The Space and Missile Defense Command Battle Lab Space Directorate sponsored the "umbrella" Tactical Space Initiative. The umbrella sheltered these separate Space-based initiatives:

- The embedded national tactical receiver that allowed the SSE to receive national Space broadcasts directly into a SPARC or peripheral component interface class computer (e.g., personal computer).
- Broadcast Imagery Request Technology Experiment that allowed the SSE to receive near real-time national imagery.
- Spectral Imagery Initiative that allowed the SSE to produce complex commercial imagery products.
- The Space operations system that allowed the SSE to perform Space analysis and planning on a small ruggedized transportable computer.

Additionally, the SMDC Battle Lab sponsored three "internal" experiments:

- Space Tactical Utility Research Network (SATURN) gave the SSE access to a Space-based Transmission Control Protocol — Internet Protocol network with downlinks of up to 2 megabytes per second.
- Vocality 100 provided multiplexing capability for the International Maritime Satellite Network.
- Wireless Web-Based Warfighting (W3), a partnered effort with the National Reconnaissance Office, allowed the SSE to access a Web-based Space mission planning system that included national imagery.

With the determination of the technology and assets

Space is in the Eye of the Beholder

available for experimentation and how the SSE would support the division, the stage was set to conduct the experiment. The 82nd Division (Airborne) was the Army Forces headquarters for MC02 that operated under a Joint Task Force and Joint Forces Land Component Commander. Just how did the Space Support Element and Space Operations Officer become an integrated member of the Army Forces team?

Integration Efforts

Because the SSE is scalable, modular, and flexible, the keys to successful integration are education, advocacy, and literacy. Two months before MC02, prior to the "spiral train-up process," a Space team visited Fort Bragg to brief the division commander, brigade commanders, and primary staff on the "value-added" benefits of the SSE for rapid decisive operations. The initial briefings included the MC02 Joint Forces Land Component Commander and key staff. The concept of Space operations was well received and SMDC was off and running.

The "down and dirty" Space education was conducted with the division's battle captains. The Space team worked carefully to educate and advocate Space operations while not becoming zealots. The one-on-one, face-to-face meetings that followed the group "spin up" were the real foundations for future MC02 success. The battle captains from each battlefield functional area were shown how Space could act as an enabler for that particular functional area (e.g., imagery for Intelligence, targeting for Artillery, planning support for the G3, etc.). Considerable time was spent discussing SSE involvement in the concept of operations, TTP, products, planning cycles, dissemination. The Army Forces not only quickly and easily grasped the benefits of Space operations but they also welcomed the chance to experiment with technology and concepts and get a look at the near future (MC02 simulated 2007) that could ultimately lead to Army Transformation goals and objectives. The ready acceptance of the SSE team into the effects-based planning process was gratifying.

Effects-Based Planning for Rapid Decisive Operations

The relationships between the SSE and the Army Forces Battle Management Center primary staff officers and battle captains allowed for timely effects-based planning. While coordination and planning occurred with almost all battlefield functional areas and staff elements, the strongest links developed by the SSE were with the following: G2 and airborne command element, G3 Plans, G5 (especially information operations), fire support/effects cell, air defense cell, long-range reconnaissance surveillance detachment, attached special operations forces element, and the digital terrain support system element.

The SSE worked a 24-, 48-, and 72-hour planning cycle that directly supported Army Forces operations and synchronized with the Joint Forces Land Component Commander's and Joint Task Force's overarching missions (sometimes this was expanded to 120 hours). A critical planning function was Space control operations that could occur in 2007. While higher echelon headquarters worked advanced planning issues, the SSE focused on how Army Space assets could best support rapid decisive operations. Once tactical planning was completed, the SSE relayed requests through the Army Forces and directly to supporting Joint higher headquarters.

Annex N (produced by the SSE), the Space Annex to the Operations Order, was refined and used as a baseline source for Army Forces enabling Space capabilities. Army- and Joint-produced threat assessments provided great insight into the threat's robust Space capabilities.

If a future brigade or mission-tailored task force needs local Space expertise/assets, a Space Operations Officer with a Space operations system could be sent to support as needed.

Besides indigenous Space capabilities, the threat had access to civil and commercial Space assets from neutral and allied countries.

The SSE routinely identified these threats and provided courses of action on how to mitigate them. These courses of action were included in the daily battle updates to the commander and to Joint Force headquarters.

An extremely strong staff relationship grew between the SSE and the information operations (IO) element. Each element spent large amounts of time and resources to continually keep each other updated and to incorporate the other's capabilities into its own plans. The IO campaign plan fully integrated Space operations.

Further, the increasing presence of trained Space officers throughout the Army was taken advantage of during planning. One or two officers on the Army Forces staff were either 3Y (Space operations skill identifier) qualified or had served in a Space-related assignment. They were extremely receptive to the SSE as a Space enabler and could easily articulate how Space could benefit their planning process to their senior officers and commanders.

SSE Battle Rhythm

How does a future concept Interim Division SSE function in a tactical environment with no precedents to follow?

The observations and lessons learned from the 2000 JCF-AWE provided a nice point of departure for SSE concept of operations and TTP development. These were then augmented by current Joint and Army Space Support Team concept of operations and TTPs. Added to this was the approved doctrine and requirements found in the Army Space Master Plan, Field Manual 100-18 (Army Support to Space Operations), TP 525-66 (Future Operational Capabilities), and Joint Publication 3-14 (Joint Doctrine for Space Operations). From these sources, a detailed experimental SSE TTP publication was written and used for MC02.

The TTP publication was invaluable, but was not the only source of information used. The Joint Task Force, Joint Forces Land Component Commander, and Army Forces Web sites had valuable planning and operational information. Jane's Space Directory and the Internet provided open-source information. The SMDC Space Operations Network and Army Space Operations Center (ARSPOC) provided a backbone for requests for information and communications with the Space community.

All these information sources and "on-call" subject matter experts back at Army Space Command allowed the SSE to tap into a vast knowledge bank to answer any questions.

The information was woven into the battle rhythm of the SSE along these lines. (See sidebar on opposite page.)

Equipment and Products

Imagery products were very valuable for the Army Forces. The SSE had an attached forward deployed section from the MoPED (two soldiers) that provided superb imagery support beyond the SSE's organic capability. Products included two-dimensional (2D) and three-dimensional (3D) maps and photos, 3D perspectives of terrain, interpretation of digital terrain elevation data, 3D fly-throughs, multispectral data and imagery. Spectral imagery products were used by the G2, G3 Plans, G5, long-range reconnaissance surveillance detachment, Special Operations forces, digital terrain support system, aviation element, and engineers.

The commercial SATURN system provided a direct data link (up to 2 Mbps downlink) back to Army Space Command's ARSPOC and the Army Space Command Remote Sensing Branch's Spectral Operations Resource Center (SORC). The "heavy lifting" imagery work was done at the SORC. The SORC was then sent to the SSE for further annotation. SATURN also provided a link to the Engineer Brigade deployed to the National Training Center, Nellis Air Force Base, Nev. Imagery was sent from Fort Leonard Wood, Mo. to the Topographical Support Team supporting the maneuver force. The SATURN feed was also provided, upon request, to the Army Forces digital terrain support system element as a system enabler.

SATURN also provided video telecon-

BATTLE RHYTHM OF THE SSE

0700: System and communication checks with ARSPOC and the Army Forces.
0800: SSE battle captain reviewed outstanding requests for information, upcoming taskers and briefings, daily planning events, reviewed classified messages, and identified Space specific tasks.
0830: SSE officer in charge (OIC) attended battle update briefing with Army Forces commander.
0900: Update of Space functional areas (e.g., Satellite communications, positioning, navigation, and timing , etc.), post updates to SSE Web site (accessible by Army Forces on their tactical local area network). Situation reports sent to ARSPOC.
0930: SSE Space officers attended course of action development sessions with the Battle Management Center.
1030: SSE OIC and officers identified key Space mission area requirements for next 24, 48, and 72 hours (sometimes as far out as 120 hours).
1300: SSE "all-hands" briefing, information exchange, issuance of taskers, etc.
1400: OIC and officers worked to maintain habitual staff relationships with Army Forces, visited each staff element, reviewed Space-enabling capabilities, assisted with planning and courses of action development for each battlefield functional area (if appropriate).
1600: OIC or senior available officer review of Space-related customer products (time permitting), update on which battlefield functional areas and staff elements sent requests for information to the SSE.
1700: Attend Army Forces planning and targeting meetings (times shifted fairly often on these planning meetings).
1830: Reviewed and closed out requests for information that had suspense for that day, updated Web site.
1900: End of shift unless products were still due to Army Forces.

Note: MC02 did not do continuous operations outside of the maneuver box.

ferencing capability between the SSE and ARSPOC. This communications link was used by the Commanding General, SMDC and Deputy Commanding General Operations, SMDC during their visits to the SSE.

The Space operations system was the primary Space planning tool; there were four of them in the SSE (two portable and two rack mounted in the SSE shelter). The portable Space operations systems allowed for potential Space operations "down range." If a future brigade or mission-tailored task force needs local Space expertise/assets, a Space Operations Officer with a Space operations system could be sent to support as needed. Through SECRET Internet Protocol Router Network connectivity, Space functional and mission areas were continually updated. These data were then applied to the military decision making process and used in planning and courses of action development. Besides global positioning system accuracy updates, weather terrain environmental monitoring and a host of other new capabilities in standard Space planning considerations were demonstrated.

For example, SMDBL developed software that allowed a Space Operations Officer to import Space Battle Management Core System ephemeris data into the BattleScape 3D visualization environment. This allowed the SSE to show the commander in 3D how a satellite's field of view could help or hinder his operations. For example, it was demonstrated that if Army Forces occupied a given piece of terrain, a threat satellite could not see them since other terrain (between Army Forces and the satellite) masked their position. This provided a good opportunity to conduct deception operations.

Another example was the use of W3. W3, developed as a Web-based prototype system, allowed the SSE to "build" a 3D visual picture of a given area of operations by importing national imagery and various communications broadcast data to show a fused picture of the operational area, to include Space.

The SSE also integrated the Advanced Warfare Environment (AWarE) capability, an Edgeview/BattleScape NT based visualization tool, with the ability to import communications and Space feeds with the 32nd Army Air Defense Command command post at Nellis Air Force Base, Nev. The result was a "one over the world" fused picture of Space, air, and ground (with some sea visibility).

The embedded national tactical reader (ENTR) card provided direct receipt of the tactical related applications data dissemination system broadcast to the SSE. This link provided some targetable data and visibility of threat emitters.

The SSE also provided this feed to the Army Forces advanced computing environment when they had radio equipment malfunctions. The ENTR is compatible with the Space operations systems and can provide a self-contained tactical receive equipment capability to the Space Operations Officer.

BRITE provided near real-time national imagery to W3 and AWarE as well as stand-alone products. This "raw" data provides an early quick look at potentially relevant imagery of a given area of operations.

Continual Space analysis, estimates, and

(See Eye of the Beholder, page 44)

Building TACSPACE:

Where Project Management Meets Combat Development

By MAJ Jeff Souder

The key focus of any project manager, regardless of his or her task, is well known and consists of three simple words: performance, cost, and schedule. Typically, the project manager will seek to meet or exceed the performance specifications set out in the applicable requirements document, stay within the budget established by his customer, and stay on or ahead of schedule, ticking off the milestones on the road to product delivery. However, as the manager in charge of the Tactical Space Initiative project for the Space and Missile Defense Battle Lab (SMDBL) during the course of the last year, my focus needed to be slightly wider than is typical and needed to include a fourth word: insight. As a project manager working combat developments in a battle lab, the insight gained through product development, training, testing, and experimentation is as important as performance or cost — for insight is a battle lab's product.

Background

The first draft of the Operational and Organizational Plan for the Interim Division Space Support Element (SSE) was written in September 2001 as a component document to the Interim Division Operational and Organizational Plan. It was written according to the concepts laid out in other Space concept documents, such as TRADOC Pamphlet (TP) 525-5 (Force XXI Operations), TP 525-60 (Concept for Space Support to Land Force Operations), and according to TP 525-66 (Future Operational Capabilities).

The SSE Operational and Organizational plan describes the operational functions and organizational structure of an element within the Interim Division responsible for providing Space support to the Interim Division commander. The SSE provides "assured access to Space products and services, and integrates and synchronizes the Space capabilities available" to the Interim Division in order to ensure the commander is enabled with "information superiority and full-spectrum dominance across the entire range of Interim Division operations."

The Operational and Organizational plan describes the SSE as being composed of Space support professionals, including Functional Area (FA) 40 Space Operations Officers and military occupational specialty 74B information systems specialists and sergeants working as a special staff element. Although primarily associated with the G5 section, each of the SSE staff officers is loosely aligned with another primary staff section in order to better support the military decision making and deliberate and hasty planning processes.

According to TP 71-9 (Force Development Requirements Determination), battle labs are responsible for producing "insights, impacts, and recommended changes to DTLOMS (Doctrine, Training, Leaders, Organization, Materiel, and Soldiers) … as well as emerging technologies and materiel initiatives to support Functional Operational Capabilities." The Space and Missile Defense Battle Lab, Space Directorate, does so with a focus on Space technologies through experimentation in various Joint and Army experiments, exercises, demonstrations, and tests.

Since the SMDBL had already been testing and experimenting with a shelter-mounted set of Space support tools in support of Army Space Command's Army Space Support Teams in late 2001, it was only a natural extension of those endeavors, fully in keeping with TP 71-9's definition of the battle lab mission, that SMDBL experiment with the materiel component to the SSE concept as well. The SSE personnel defined in the SSE Operational and Organizational plan would require a set of tools and

The SSE provides "assured access to Space products and services, and integrates and synchronizes the Space capabilities available" to the Interim Division in order to ensure the commander is enabled with "information superiority and full-spectrum dominance across the entire range of Interim Division operations."

a place in which to work, in order to provide the prescribed support to the Interim Division commander. The director, Space Directorate, SMDBL, Kirby Brown, decided that we would build a toolset to support the SSE, train an experimental SSE, and experiment with the concept in Millennium Challenge 2002 (MC02). Mr. Brown's vision was that with the DTLOMS insights gained through experimentation, and in conjunction with the work done to develop the SSE Operational and Organizational plan, SMDBL Space Directorate could provide much of the foundational data and information needed to write an operational requirements document for an SSE.

The TACSPACE Initiative

Work began on the Tactical Space Initiative less than one year from the start of the MC02 experiment. At that time, SMDBL was already experimenting with most of the materiel components that would later be incorporated into the toolset solution for the experimental SSE, but we had very little doctrine, no training, no leaders, an organization described on paper only, and no integrated materiel. From a project manager's standpoint, the challenges were significant. Performance had to be in keeping with the requirements described in the SSE Operational and Organizational plan. We had a very limited budget and a tight schedule determined in part by the ramp-up exercises, or spirals, designed to prepare participating organizations and initiatives for the experiment. Our overriding objective, of course, was to gain insight. We had seven months before the first spiral to prepare. Work began immediately on two fronts: doctrine and materiel.

Although SMDBL is not responsible for writing doctrine, we found it necessary because of the conceptual nature of the SSE to derive from various doctrinal and nondoctrinal sources the specifics of what the SSE would do and how it would function in order to develop some of the training. The rest of the training would be decided by the materiel solution. This concept of operations, which we defined as the SSE tactics, techniques, and procedures (TTP), was derived from 12 different sources of information that included Army field manuals, various TRADOC pamphlets and concept documents, locally sponsored Space studies, a Chief of Staff of the Army white paper, and various training plans, briefings, and draft documents dealing with Space operations.

The core documents used in developing the TTP, however, were those associated with the SSE Operational and Organizational plan. Along with this plan, the Space and Missile Defense Command's Liaison Office to the Combined Arms Command at TRADOC also developed a high-level operational architecture and a set of information exchange requirements. These products defined much of what the SSE would do for the commander and his staff, from whom it would receive information, to whom it would provide information, coordination and synchronization linkages, and the products it would produce.

The 255 page TTP document was refined as we prepared for the experiment and it became the heart of the initiative. It defined the SSE and the Toolset, known as the SSE-T, the SSE division of labor, 30 different tasks, the SSE battle rhythm, and the various subsystems that constitute the SSET. This document was the determinant of many of the training requirements and drove the data collection plan for the experiment as well.

The SSE Operational and Organizational plan, operational architecture, and information exchange requirements, and the derivative TTP, became our requirements

for the materiel solution for the SSE-T. The tasks defined in the TTP, the entities and organizations with which the SSE must communicate, and the reports and products that the SSE must provide, all required a set of tools and a place from which the SSE could operate.

As mentioned above, because SMDBL had already been experimenting with a number of Space support tools, devices, and communication capabilities, we faced primarily an integration effort to get these disparate items working together in an efficient and effective manner.

The SSET became a self-contained system that was integrated into an S-787 shelter mounted on a HMMWV with on-board power generation, backup, and conditioning capability. For additional workspace, two Alaska-brand tents were erected and connected to the shelter. The SSET is composed entirely of commercial off-the-shelf and government off-the-shelf automation and communication hardware and software and can be connected to both classified and unclassified data networks through local area networks or satellite communication systems.

Army Space Command assigned an Army Space Support Team to be the experimental SSE and released them to participate in training, experiment preparation, and the experiment itself for the better part of five months, beginning in April 2002. We developed training based upon the TTP, the hardware and software making up the SSET, and experimental considerations, such as data collection, the conduct of MC02, and the various organizations involved in the experiment.

All told, there were 16 training events conducted over a six-week period and concluding with a three-day dry run exercise. Training included technical instruction on how to operate the various pieces of computer hardware and software, how to install and operate the communication systems, and how to emplace and road march the SSET itself. There were classes designed specifically for the SSE officer in charge to ensure that he or she understood the battle lab mission, and the objectives and conduct of the experiment. All SSE members attended classes focusing on the TTP, the 32 products they were to provide the staff they were supporting, and the information they would need to gather from other organizations and staff sections. Each SSE member was also trained as a data collector. Each would be responsible for providing feedback at the conclusion of the experiment regarding his or her particular role. We also provided training that instructed the SSE as to the mission, roles, and functions of some of the other Space support organizations, such as the Army Space Operations Center and the Spectral Operations Resource Center.

The three-day dry run event was designed to simulate as closely as possible the conditions, tasks, and standards that would be expected of the personnel and equipment during the actual experiment, in order to ensure that we were ready to execute the following month at Fort Bragg, N.C. The dry run was a success in that we recognized some training shortfalls, identified a number of technical problems or oversights, and were able to practice collecting some of the data we would need to provide DTLOMS insights later on.

MC02

The SSE, the SSET, the subcomponents, the data collectors, and the support team were ready to participate in Spiral 3 at Fort Bragg in May 2002. The spiral, as intended, revealed some integration hurdles between the SSET and its supporting and supported elements that we needed to overcome as well as a few hardware and software problems within the SSET that we needed to work out. Overall, however, the spiral demonstrated to SMDBL that we had a workable experiment and that the SSE and toolset would most likely provide value-added to the division staff.

By MC02 STARTEX in mid-July 2002, we had completed modifications to the SSET necessitated as a result of Spiral 3, conducted sustainment training and new equipment training (because of modifications) for the SSE, polished up some of the details in the TTP, and improved the mechanism by which the SSE would communicate with the division staff. By all accounts, the Tactical Space Initiative participation in MC02 that followed was an

The mission area analysis must assess strategy, policy, threat capabilities, doctrine, technology, and budget to identify capability deficiencies and the timeframe to correct them.

overwhelming success. From a program manager's perspective, it was equally successful because we had met our performance objectives by building, testing, training, and delivering a team and a toolset that functioned according to the doctrinal mission. We had done it on time and within our budget. But we have not yet completed the SMDBL mission. We still need to provide DTLOMS insight.

The Very Near Future

During the next few months, SMDBL will reduce and analyze the data collected during the experiment and the training and development leading up to that experiment. One of the ways in which we will provide DTLOMS insight is by providing the results of experiment analysis back to SMDC and TRADOC CAC. Another way is by participating in a workgroup associated with the Space Integrated Concept Team that will write an operational requirement document for the SSET.

Much of the information required to start an operational requirements document and to serve as the core of the document has already been produced in one form or another. Since the SSET will not be an Acquisition Category 1 program, a mission needs statement is not required. However, the work that has been done by SMDC and CAC in developing the SSE Operational and Organizational plan might be likened to a mission area analysis as defined by Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01B. According to the instruction, the mission area analysis should identify capability deficiencies and the timeframe that these deficiencies will exist and use a "strategy-to-task" methodology (e.g., National Military Strategy to individual mission tasks) to identify the operational and support tasks needed to meet mission objectives. The mission area analysis must assess strategy, policy, threat capabilities, doctrine, technology, and budget to identify capability deficiencies and the timeframe to correct them. In comparison, the first two paragraphs in an operational requirement document describe the operational capability required of the system and the threat it is designed to counter. Much of this content exists in the mission area analysis.

A mission needs analysis as defined in the same instruction is designed to assess one's ability to accomplish the tasks identified during the mission area analysis. The mission needs analysis uses a task-to-need methodology to identify mission needs. It can also highlight technological opportunities and identify reliability and maintainability improvements that enhance warfighting capability. These elements of information will include many of the insights that the battle lab can provide as a result of our data reduction and analysis of MC02 data. In collaboration with the Space Integrated Concept Team workgroup, we can formulate this mission needs analysis in such a way that it fits well into paragraphs three and four of the SSET operational requirement document (Shortcomings and Capabilities Required), thus completing the core of that critical document.

Conclusion

In less than one year, SMDBL took a draft concept and designed and built a complex hardware and software system, trained an organization, wrote and refined a detailed set of TTP, and formed the Tactical Space Initiative. After in-depth and iterative testing, we successfully participated in the Joint Millennium Challenge 2002 experiment. We faced significant performance, cost, and schedule limitations, restrictions, and challenges, much like any organization involved in project management will face. But by keeping focused on a fourth project management principle, that of insight, during every step of the way, we will be better able to ensure that we are successful in meeting a greater objective: that of providing insights, impacts and recommendations regarding Space DTLOMS as the Space and Missile Defense Battle Lab.

MAJ(P) Jeff Souder currently serves as project manager, Army Space Exploitation and Demonstration Program and as Deputy Chief, Experiments Division, in the Space and Missile Defense Battle Lab, Space Directorate, in Colorado Springs, Colo. An Acquisition Officer with both Signal Corps and Air Defense Artillery experience, Souder has previously served as Deputy Product Manager, Tri-Band Satellite Terminals, and as Chief, Modeling & Simulation Branch, Directorate of Combat Developments, U.S. Army Signal Center.

Space Experimentation in Millennium Challenge 2002

By Kurt C. Reitinger

The purpose of this article is to describe the role of Space experimentation in Millennium Challenge 2002 (MC02) and the primary lessons learned for application in future experiments. Overall, Space and Missile Defense Command (SMDC) played a significant role in MC02 by providing Space support and experimentation to multiple echelons.

Initial Planning

Though Army planning started a few months earlier, Headquarters (HQ) Army Training and Doctrine Command (TRADOC) kicked off the main MC02 effort with an Initial Planning Conference in March 2001. Several SMDC representatives participated in the early stages of planning, including the meetings of several integrated process teams. The process teams that were established met at periodic intervals for the next several months to refine plans. The primary teams for SMDC interaction were the Management Oversight and the Initiatives integrated process teams.

SMDC Objectives

SMDC's overarching objectives included three main elements: document the criticality of Space in future operations (specifically in rapid decisive operations under the microscope in MC02); identify Space and missile defense solutions for Interim and Objective Forces; and continue along the path to normalize Space. Underneath these objectives, the command developed specific objectives by mission area. The next layer of objectives detailed specific objectives for each initiative.

Initiative Approval

Initiatives make up one of the two categories of information explored during advanced warfighting experiments; the other category is issues. Initiatives are generally materiel-based solutions to warfighter-identified shortfalls. Issues are generally nonmateriel areas of interest or concern. Given Space and Missile Defense Battle Lab's (SMDBL's) historical approach in applying technology to solve warfighter challenges, SMDC's primary focus was on initiatives.

For MC02, the Joint Forces Command (JFCOM) and TRADOC requested that each battle lab provide nominations of initiatives for review. These submissions were then evaluated for their appropriateness in this venue. SMDC major subordinate elements pulled together 22 unclassified initiatives and two classified initiatives. While most of these were service level only, there were a few Joint nominations. Unfortunately, the JFCOM deadline for initiative packets was prior to the Army's internal deadline, so TRADOC did not establish a process for review of Army-nominated Joint initiatives. Moreover, because TRADOC did not effectively facilitate any Army nominations to JFCOM, SMDC had to submit Joint initiatives directly to JFCOM — and SMDC was the only Army unit with Joint initiatives.

SMDC's initiatives were briefed at the TRADOC Issues and Initiatives Review Board (IIRB) in May 2001. The board was hosted by Joint Venture of HQ TRADOC; representation included HQ Army Forces Command and HQ Department of the Army. Of the initial 24 SMDC initiatives, the IIRB fully approved five and conditionally approved 11 for inclusion in MC02. These

MC02 was a big success for SMDC experimentation with more than 50 personnel deployed throughout the continental United States in support of multiple echelons of command. The experiments conducted will be key to the next several years of initiative development. Overall, MC02 was a great example of achieving the command's motto to "secure the high ground!"

16 represented nearly half the Army's total number of initially approved initiatives. SMDC's success with initiative inclusion was due primarily to preparation:

- The concept for each initiative was well-explained.
- Initiatives addressed an existing need.
- Initiatives were linked to Army experiment objectives.
- Initiatives were sufficiently mature.

Initiative Coordination

After IIRB approval, each initiative team — consisting of a government representative and contractor support — entered a detailed coordination and preparation process for the event. Throughout the planning process, the proposed initiatives were modified or withdrawn to reflect experiment configurations, evolving objectives, readiness for experimentation and the aftermath of September 11, 2001. The final initiative count left SMDC with four of the Army's 11 initiatives.

One major category that required initiative team coordination was analysis. In each experiment, TRADOC charged the TRADOC Analysis Center to develop a study plan, which includes a system assessment plan for each initiative.

The Army Test and Evaluation Command had overall responsibility for the system assessment plan's data collection and management effort. The plan contains information categories and questions that must be answered about each system's suitability, effectiveness, and survivability.

Thus, for MC02, a system assessment plan was developed for each approved SMDC initiative. Each SMDC initiative team provided all information for these plans and, in some cases, even wrote the draft plan. These plans were primarily focused on effectiveness, that is, the value-added to the supported unit.

In addition to the TRADOC, TRADOC Analysis Command, and the Army Test and Evaluation Command analysis and data collection effort (referred to as external), SMDBL established internal data collection plans. Initiative teams gathered detailed quantifiable data and observations that included each system's suitability, effectiveness, and a degree of survivability. The insights collected by a host of SMDBL personnel will be reflected in revisions to the Space and missile defense categories of doctrine, training, leader development, organization, materiel development, and soldiers (DTLOMS).

Throughout the months preceding MC02/AT Ex02, in-process reviews became commonplace. Initiative teams conducted such reviews both internally and with other initiative teams, while SMDBL conducted them with participants as well as command leadership. These in-process reviews provided a formal and effective means to keep the entire team updated, informed and focused on key milestones, activities, and suspense dates.

Initiative Training

SMDC provided initiative orientation training to supported units during a visit to Fort Bragg, N.C., in April. During these sessions, SMDBL leadership briefed 82nd Airborne Division key leaders and staff while initiative action officers provided more detailed training to staff officers.

(See Experimentation, page 46)

Spectral Information Supporting Rapid Decisive Operations

By John McMurray and Russ Robinson

As part of Millennium Challenge 2002 (MC02), the Spectral Information Initiative applied advances in remote sensing technologies to create timely, high-resolution battlespace visualization for Army Forces engaged in tactical operations. Army Space and Missile Defense Battle Lab planned and sponsored the initiative to examine the impact of a system of spectral information systems on the ability of an Army Forces staff to sense the battlespace and perform intelligence preparation of the battlefield, when provided timely spectral products. Army Space Command executed the initiative using spectral tools and analysis personnel from its multiservice Spectral Operations Resource Center (SORC). Insights from this experiment will refine Army requirements for Space, airborne, and ground spectral systems, including near-term tools for the SORC and Army Space Support Teams, and longer-term components of the tactical exploitation system, the distributed common ground station, and the digital topographic support system.

Technical Background

Ongoing remote sensing technology advances include spatial resolution, timeliness, and spectral discrimination of materiel types. Commercial satellite imagery providers have begun to deliver Earth images with spatial resolutions at or below one meter, containing sufficient detail to provide significant intelligence and situation awareness value. Direct downlink systems can capture images moments after the commercial satellite overflight, making the images valuable for military missions. Spectral imagery includes color information in the visible and nonvisible spectra, which offers sufficient information content to enable machine assisted image and signature analysis. Such automated assistance can greatly increase productivity of intelligence analysis, accelerate detection of targets and materiels, and extend our ability to rapidly produce map information.

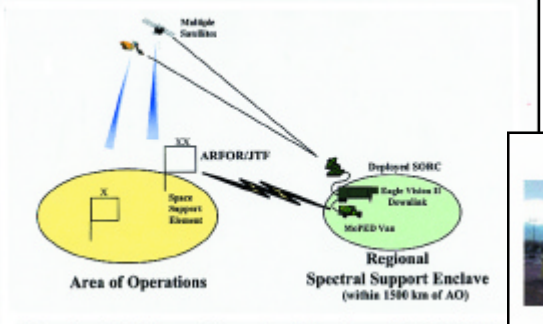
Initiative Concept

The Spectral Information Initiative integrated nine civil-commercial imaging satellites, a regional support enclave containing direct downlink and image processing tools, high data rate communications, and a small support element at the Army Forces headquarters to generate and deliver battlespace visualization products. Components of the initiative all exist today, and were organized in a package tailored to anticipate expected capabilities in 2007. Key elements were panchromatic, multispectral, and hyperspectral imaging sensors, accelerated satellite tasking methods, direct downlink to mobile ground stations, advanced data processing systems, and access to high-data-rate commercial communications capabilities. This concept was built upon lessons derived during the FY 2000 Joint Contingency Force Advanced Warfighting Experiment in which a spectral support cell provided valuable augmentation to a deployed tactical exploitation system at the corps level.

Initiative Execution

Spectral information support must be agile to handle a variety of possible geographic, organizational, and mission contingencies. The architecture chosen for MC02 appears in Figure 1. A regional spectral support enclave consists of an Eagle Vision II, commercial imaging direct satellite downlink ground station, and a

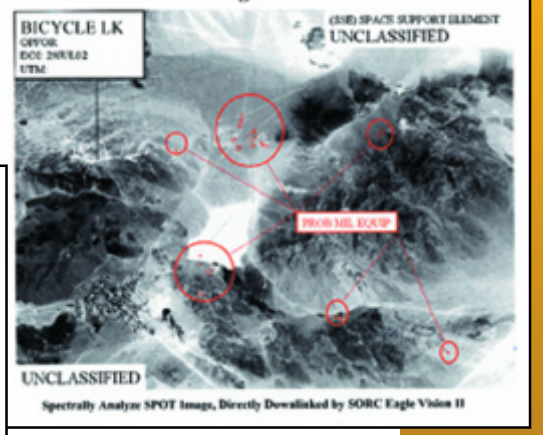
Figure 1



Spectral Information Architecture for MC02

Figure 2

Figure 3



Spectrally Analyze SPOT Image, Directly Downlinked by SORC Eagle Vision II

Mobile Processing, Exploitation and Dissemination Van, performed data acquisition, analysis and production. The regional enclave supported a two-person spectral imagery support team operating a spectral workstation within the Space Support Element at the Army Forces headquarters. Figure 2 depicts these assets. A high-data-rate commercial satellite communications system allowed product delivery across echelons without taxing tactical networks.

Initiative Results and Products

Results of the Spectral Information Initiative were very positive. The spectral systems succeeded in delivering 15 new image sets over the battlespace and more than 40 individual battlespace visualization products tailored to meet Army Forces Information Requirements during the exercise. Direct downlink, in-theater processing, and satellite communications enabled spectrally analyzed battlespace images to be in the hands of the G-2 within 2 ½ hours of the image collection time. Spectral images used as display backgrounds on Army Battle Command Systems improved battlespace awareness and allowed the G-3 to more confidently place phase lines and unit boundaries on features, which soldiers could recognize on the ground.

The Spectral Support Enclave concept effectively delivered the advantages of timely direct data downlink while not burdening the headquarters with a large equipment and personnel footprint. Key emerging insights involved methods for ensuring that image processing efforts expended at the Spectral Support Enclave are synchronized with the Military Decision Making Process ongoing at the Army Forces headquarters. These insights will support future improvement in tasking, processing, and usage procedures for imagery-derived information.

Products created by the Spectral Operations Resource Center and delivered to Army Forces by the Space Support Element enhanced timely battlespace awareness. Figure 3 depicts Army Forces battlespace prior to the airborne insertion. It was created from a SPOT satellite spectral image downlinked through the Eagle Vision II ground station, and was delivered to the Army Forces staff less than three hours after the image was taken. The equipment indicated was detected using spectral information in the data.

Figure 4 depicts an operating site within the same Army Forces battlespace, based on a separate Ikonos satellite image. Cross-hatching indicates spectral detection of camouflage materials. Capturing this level of detail over broad areas with direct downlink is a goal of Eagle Vision II.

Figure 5 portrays a three-dimensional perspective view of a small village site. Combining spectral images and NIMA elevation data created such perspective views. Participants valued this type of product for planning and mission rehearsal. Spectral information allows discrimination of roofing types among the buildings.

Lessons Learned

Feedback from participating units indicated that timely, rapidly processed spectral images showing potential military targets were very useful. Army Forces commented that clear drop zone images generated using high-resolution commercial sources would help soldiers overcome disorientation experienced upon initial insertion. Staff personnel frequently sought situa-

(See RDO, page 46)

Ribbon cutting ceremony marks opening of new home for Army Space

By MAJ Laura Kenney

With a "snip" from a pair of oversized scissors, the star-spangled ribbon was divided in two, marking the opening of the long awaited 'home' for Army Space Command.

Officiating at the ceremony held on Peterson Air Force Base, Colo., Oct. 9 were two senior officers, signifying the importance and weight of the event. ADM James O. Ellis Jr., commander, U.S. Strategic Command, and LTG Joseph M. Cosumano Jr., commander, U.S. Army Space and Missile Defense Command and U.S. Army Space Command, did the honors.

They symbolically opened the new headquarters by cutting the red, white, and blue satin ribbon at the start of the sidewalk leading to the building. That walkway was lined with flags representing each of the 50 states and American territories.

The new Building Three, with its soaring, futuristic architecture evoking limitless horizons, is obviously symbolic of the future, but also representative of a substantial past. Its unique coloration, a silvery, metallic green, immediately marks it out among its peers in the Space Complex as "the Army building," the exact intent of its designers. Conceived of in 1989, and undergoing numerous transitions in design since due to the burgeoning nature of the Army's role in Space, ground for the 103,000 square foot building was broken in July 2000. It was completed on time and within budget July 2002.

Cosumano welcomed the large crowd composed of local dignitaries, former commanders of Army Space, service men and women from all branches, and reporters.

"Today, which seemed a long time in coming, is a very significant day in the history of Army Space Command," he said. "The two things that are of the most import about this magnificent facility are that, first, we are now physically located on a secure military installation. Secondly, we are now co-located within this Joint Space Complex alongside those other members of the Joint Space team charged with providing Space support to the warfighter and our nation."

Cosumano traced the history of the Army's involvement in Space, going back to 1943 with the establishment of the Ordnance Rocket Branch to manage the development of rockets. He cited the Army's many accomplishments, which have earned it the justified fame and slogan of "First in Space."

Bringing that history into modern times, Army Space's commander spoke of contributions during the Gulf War, through and including the Global War on Terrorism. Cosumano described the development of the concept for the building, which closely mirrored the growth of the Army's increasingly larger role in Space.

"Army Space soldiers have supported the full spectrum of military operations. Today, the soldiers and civilians of Army Space are on the cutting edge of normalizing Space support, serving the warfighter around the globe.

"Though small in number, approximately 600 soldiers and civilians — compare that to the five who started things back in 1986! — Army Space is there, 24/7, 365 days a year, to provide the warfighter and others the Space support they need to effectively carry out their mission of defending this great nation, its allies and friends from all enemies.

"From this location, we will continue providing Space capabilities to the Objective Force. Space provides a global quality and element to any Force using it,

Left: ADM James O. Ellis Jr., commander of the new U.S. Strategic Command, center, and LTG Joseph M. Cosumano Jr., Commanding General U.S. Army Space and Missile Defense Command with the help of other dignitaries, cut the official ribbon marking the opening of the new U.S. Army Space Command headquarters building. Below left: ADM James O. Ellis Jr. and LTG Joseph M. Cosumano Jr. stand at attention during the ribbon cutting ceremony. The new building, below right, is located in the Space Complex on Peterson Air Force Base in Colorado Springs, Colo. U.S. Army Space Command is part of the U.S. Army Space and Missile Defense Command.

PHOTOS BY SHARON L. HARTMAN

and without Space, any military is just a regional force. We will continue to ensure our nation's security with these capabilities so vital to the prosecution of warfare in the 21st Century.

"Today is the dawn of a new day for Army Space, as we cut the ribbon for this superb facility. This headquarters facility will have connectivity with all our Space Forces deployed around the globe, and assist in integration with our sister commands and higher headquarters."

On that note, the narrator introduced STRATCOM Commander Ellis.

In gleaming gold and striking black dress uniform, the naval admiral addressed the crowd.

"To the people of this exceptional command, and all those who went before you pioneering in Army Space, I say, 'First indeed.' I challenge you to maintain and hone the edge that Space capabilities give our nation.

"The technological innovations of modern times allow us to fight on our own terms and decisively control the battlefield. The synergy created by the recent command restructuring adds to the global perspective of the domain of Space. Strong component relationships will allow us to be both flexible and rigorous in the face of new challenges.

"These challenges are not unique to our times. Heavy armor, once the deciding factor in battle, fell to the creation of the longbow. Our challenge is to use the new technology in bold new ways, and Army Space Command is uniquely suited to do just that.

"You will meet the challenges. The future is ours, as long as we, using a naval saying, 'Steer by the stars, and not by the wake behind you'."

The admiral and the general then led the crowd into the new headquarters for another ceremony. This one honored a deceased Space pioneer, MG John B. Medaris, who oversaw much of the early Space program. He became the first inductee to the Pioneer Conference Room, a space designated to honor those men and women who furthered the efforts of the Army in Space.

A portrait of Medaris was unveiled in the spacious lobby of Building Three by his daughter, Mrs. Marta Smith. It was then carried into the Pioneer Room and hung, with the assistance of the Army Space and Missile Defense Command Soldier of the Year, SGT Robert Orndoff.

"My father had a real sense of history, and I can definitely speak for him when I say that he would be so very proud of all Army Space has accomplished, and proud that his portrait will hang here in this incredible building. He was very passionate about the defense of the nation, and what Space could do toward that goal, and I salute each and every one of you for carrying on that goal," said Smith.

A reception followed.

The huge lobby of the new building was created with vast areas of space and light. A backup version of the first U.S. satellite, Explorer 1, built by the Army and launched by an Army rocket, the Jupiter C in 1958, is suspended from the ceiling. An immense photograph of that rocket launching dominates the lobby, with the gleaming rocket trailing a vivid stream of fire.

From the exterior, the building arches to a sharply angled point, drawn from the serrated spear in the Command's crest, as a metaphor for Space travel. Geometric cutouts of the building's front entrance

(See Ribbon Cutting, page 31)

Army Space soldiers compete in first ever Army-wide SOY/NCOY board

By Sharon L. Hartman

Two Army Space soldiers, representing the entire U.S. Army Space and Missile Defense Command, became a part of history when they competed in the first ever Department of the Army level Noncommissioned Officer and Soldier of the Year Competition Sept. 23 - 27.

SSG Darrick Noah from Army Space's Regional Satellite Communications Support Center in the Pacific, and SGT Sherman Johnson of B Company, 1st Satellite Control Battalion, vied against 11 NCOs and 10 soldiers for the titles of DA Noncommissioned Officer and Soldier of the Year, respectively.

The inaugural event got under way Sept. 23 at Fort A.P. Hill, Va., with an early morning Physical Fitness Test and a written exam.

After that, the action was non-stop through Wednesday, with competitors performing a myriad of Common Task Tests, such as day and night land navigation, M-16 qualifications, first aid, camouflage, chemical decontamination, and, to top it off, a mystery event featuring two more CTT tasks.

The mystery turned out to be a 5.3 mile road march with loaded rucksacks into a chemical environment.

During the events at Fort A.P. Hill, the "man behind the competition," Sergeant Major of the Army Jack Tilley, visited competitors.

"That mystery event sounds pretty simple, right? They had to walk five miles with 40 pounds on their backs. No problem. Any soldier can do that. But at the end of that test they got hit with "gas" (smoke). They had to put on their protective masks, run about another quarter of a mile, drop into a fighting position and engage targets and qualify. Then they had to clear mines. Think about it. That was really hooah stuff. That's what soldiers do," said Tilley.

Tilley offered words of thanks and encouragement. "Look at these soldiers that are here today. The Army is 1.3 million people. These 23 had to go past 1.3 million others to get here. Now that's an accomplishment," he said.

The competition continued in Arlington, Va., with competitors going before a board of seven command sergeants major — Tilley chairing the board. Most competitors agreed that it was quite different from boards they've gone to before.

"The format of the board was interesting," said SFC Robert York, sponsor for Noah from RSSC Pacific.

"I've never seen that rapid-fire question after question. It's a neat way to run a board. You'll probably see a lot more of that soon. Start looking at brigade and MACOM boards next year and I'll bet they start looking just like them."

With the events over, competitors were treated on Friday morning to breakfast at the MCI Center with Tilley. Breakfast was followed by a performance of the highly acclaimed show "Spirit of America" featuring the 3rd U.S. Infantry (The Old Guard) and The U.S. Army Band (Pershing's Own). Of special note was an announcement at the beginning of the performance naming Tilley as the host, and the competitors as co-hosts of Friday's show. With spotlights streaming across the competitors, the audience gave a resounding round of applause.

A formal dinner provided the setting for announcing the winners. The Secretary of the Army Thomas White, Chief of Staff of the Army GEN Eric Shinseki and

PHOTOS BY SHARON L. HARTMAN

Above: SGT Sherman Johnson of B Company 1st Satellite Control Battalion lends a hand to SGT Darrick Noah of the Regional Satellite Communications Support Center — Pacific, while preparing for the mystery event at the first ever Department of the Army NCO and Soldier of the Year Competition. The two Army Space Command soldiers proudly represented U.S. Army Space and Missile Defense Command at the competition, which was held Sept. 23-27 in Fort A.P. Hill and Arlington, Va. Center: l-r SGT Noah and SGT Johnson receive words of wisdom from SMA Jack Tilley during a break in the competition. Right: SGT Noah stays focused as he starts the mystery event.

SMDC's Commanding General, LTG Joseph M. Cosumano Jr. were in attendance.

"This is the first ever Army-wide Soldier/NCO of the Year competition," said Cosumano.

"It has been a long time coming because we've really never recognized the best of the best. This competition allows us to focus as an Army on those NCOs and soldiers who represent the vast differences that are put together in one army. SGT Noah and SGT Johnson represent the best that we have at SMDC. They've gone through tough competitions just to be here representing Space Command."

"Everybody's a winner here at the competition. It doesn't really matter how they did. They are two of 23 in the whole United States Army of over a million people, so no matter how they came out, they're winners. Everybody here tonight is a winner."

In agreement with Cosumano was Command Sergeant Major of SMDC, Wilbur Adams Jr. who said, "I'm proud of them regardless of the results. That part doesn't matter to me. They are very, very sharp. They have a lot of energy, and they're the type of young sergeants you want your brand new privates, PFCs and specialists to identify with and gravitate towards when they show up at the units. They are positive. They know what's required to develop young soldiers. The example they set lets young soldiers know that, if these guys can do it, so can they.

"Don't be afraid to go out there and take a chance on a competition," Adams said.

"Johnson, Noah, the training cadre who went down to Fort A.P. Hill and we sergeants major — we're all better because of the things that we learn from each other. They might say they learned a lot from the sergeants major, well, we learned equally from them. When we go back at the end of the day smarter than we were at the start, I think the unit becomes a better unit."

As competitors, Noah and Johnson added a bit of advice from their perspective.

"Do it," said Noah.

"Don't get discouraged into thinking that because you're not in a tactical or high speed MOS, you're not going to be a competitor. Just because somebody may have an edge doesn't mean you can't compensate for it in some other event."

"Have a good attitude when you come here," added Johnson.

"It's a lot of work, but we learned about other parts of the Army we're not normally exposed to. We really enjoyed ourselves. It was an amazing experience."

The winners, announced after much anticipation, were SFC Jeffery Stitzel, an infantryman with the Old Guard at Fort Myer, Va., and SPC Justin Brown, a measurement and diagnostic equipment specialist from Baumholder, Germany. The two were given the titles of the first ever DA NCO and Soldier of the Year, respectively. Prizes included an all-expense-paid trip to Disney World, a five-minute shopping spree at the commissary, and the opportunity to choose their next assignments.

"It would have been great to win. But just being here, and playing a part in history being made was prize enough. I'd recommend the experience to anyone," said Noah.

Sharon L. Hartman, a civilian contractor, has served in the Army Space Command Public Affairs Office for almost three years. She is a computer graphics designer, journalist, and photographer.

Focus on Soldiers

Contributions from the Field

Space soldier makes connections for Red Cross in Afghanistan

BAGRAM, Afghanistan — For service members deployed to various "hot spots" around the world, the Red Cross is a critical lifeline leading back to loved ones.

"For the Red Cross, the most critical thing is connectivity," said Vera Kellar, Red Cross Station manager for Station 1 in one of the "hottest" — literally and figuratively — spots of the world today, the virtual "headquarters" of the Global War on Terrorism.

No soldier wants to get that emergency phone call from the Red Cross — unless the news is joyous as it would be with a birth announcement — but the alternative, not hearing at all, or hearing days after a sad event, is unthinkable.

An Army Space Command soldier was able to help get that critical "connectivity" up and running in record time.

Red Cross Station 1 had begun setting up its essential mission of providing emergency services to the soldiers, airmen, Marines, and sailors deployed here in support of Operation Enduring Freedom.

According to Kellar, SGT Sean McGrane of Army Space Support Team 4, from Colorado Springs, Colo., "got us an ETHERNET connection so we could share messages between our computers" a few days before the direct connections were installed in the building.

"The folks at Bagram really helped us, but he gave us that extra piece that enabled us to use two computers at once, making us operational long before we had expected to be," said Kellar.

Kellar added, "SGT McGrane is a true 'friend of the Red Cross.' He's always very attentive and asks if we need anything. He's an excellent young soldier who is committed to what's going on around him."

Of his assistance, McGrane said "By helping the Red Cross, I'm really helping myself and my fellow soldiers. Before I came here, I had no idea that they did so much to help the American service member. The quality of life in Bagram has increased exponentially since the Red Cross Station opened."

Submitted by MAJ Robert N. Zaza, 1st Space Battalion (See photo on page 30 RED CROSS)

National Guard director visits Army Space soldiers

PETERSON AIR FORCE BASE, Colo. — LTG Roger C. Schultz, director of the U.S. Army National Guard, visited mobilized soldiers of his component when he toured Army Space Command on Halloween day.

Accompanied by Colorado's National Guard leadership, the Adjutant General, Air Force MG Mason Whitney, and the Commander of Colorado's Army National Guard, BG Ronald Crowder, Schultz toured Army Space's new facilities here to include the Army Space Operations Center, and received mission briefs and updates. These included examples of Space-based products and imagery that are provided to the warfighter. But the highlight of his visit was definitely lunch with soldiers of the 193rd Space Support Battalion, a National Guard battalion mobilized after the tragedy of Sept. 11, 2001.

The 193rd has sent three Army Space Support Teams on overseas deployments during the past year in support of Operation Enduring Freedom, to Korea and Southwest Asia. Teams deployed with a mission of integrating satellite-enhanced capabilities into daily military operations, such as communication, navigation, intelligence, surveillance, reconnaissance, environmental monitoring, and missile warning operations.

BG Richard V. Geraci, deputy commanding general for operations, U.S. Army Space and Missile Defense Command, and deputy commanding general, U.S. Army Space Command, hosted the National Guard digni-

taries.

Schultz enjoyed a buffet luncheon at the NCO Club here with members of the 193rd. The horseshoe table format enabled open conversation, with specialists sitting next to colonels, and sergeants rubbing elbows with generals.

The director spoke at length in the informal setting, thanking the soldiers for their "stepping up to the plate" when their nation called.

"I am totally aware of what this mobilization meant to you," said Schultz.

"The same issues that confront you are the ones facing the nation today. You soldiers have been on an expanded tour of duty, and your families have been there right along with you. We might as well have had them there raising their right hands when you enlisted.

"In today's world, we have to ask for readiness in not only our soldiers, but in your families, and in your employers. I recognize the sacrifices that all three groups have made in this marathon mission. This is volunteering at its finest."

Schultz remarked on the significance of the Space mission that 193rd soldiers perform.

"Current operations demonstrate just how critical the mission you perform is. Daily, the importance of Space is brought home. A steady flow of communication to and from the warfighter is absolutely essential, and that's one of just many many areas in which you soldiers are absolutely essential. Keep up the good work, your Army and your nation depend on you. I have total confidence in you."

By MAJ Laura Kenney, Army Space Command
(See photo on page 30 NATIONAL GUARD)

Army Space soldier shines in Thailand's Cobra Gold exercise

OKINAWA, Japan — A soldier from E Company, 1st Satellite Control Battalion, Army Space Command, had the opportunity recently to return to the exotic land of his birth, and perform an important mission at the same time.

SPC Pratan Ratanapinta, a 22-year-old satellite network controller, originally from Thailand, returned there when he deployed for this year's Cobra Gold Exercise. Sent as a Ground Mobile Forces Network Control liaison and equipment operator, Ratanapinta assisted the Kadena Air Force Base 353rd Special Operations Group in achieving its mission and much more.

During the two weeks of deployment, Ratanapinta was responsible for operating and maintaining the AN/USC-60A, a light transportable satellite communications terminal. The terminal provided Defense Secure Network (DSN) and Secret Internet Protocol Router Network (SIPRNET) services as direct support for the Combined Joint Special Operations Task Force.

"Everyone there was very impressed with our systems, and excited about their future potential," said Ratanapinta.

In addition to duties as an operator and network control liaison, Ratanapinta assisted with language translations to help overcome communication barriers between the Thai and U.S. Forces. He had the distinguished opportunity to provide a brief for the Thai Special Warfare Commander on the terminal equipment.

Military officials from more than 18 countries observed the annual Joint exercise this year, in hopes of future participation. They toured the training areas to observe what was going on, what it looked like, and how the exercise ran.

Ratanapinta had opportunities to enjoy his time outside of duty.

"The Thai Signal soldiers invited us out for dinner. They wanted us to experience several Thai dishes and to understand more about each other."

Soldiers in E Company are hopeful that Ratanapinta's excellent service during his deployment laid a foundation for a solid relationship with the units participating in Cobra Gold, and that future opportunity for cross-training will become more common.

Submitted by SSG Franklin Barrett, E Co., 1st Satellite Control Battalion
(See photo on page 30 COBRA GOLD)

Army Space soldiers take Ranger-style challenge

LANDSTUHL, Germany — Rangers are no longer the only ones who get a competition to determine the best among the best at soldier skills. Soldiers at C Company, 1st Satellite Control Battalion, Army Space Command, recently organized and participated in their first "Best Soldier" Competition. The competition — modeled after the famed "Best Ranger" Competition — pitted individual soldiers against one another as they sought to complete an arduous five-mile course with various tasks in the fastest time possible.

"It was rough. I definitely broke a sweat, but overall I had a great time," commented SGT Glen Shockley after completing the ordeal. Shockley took third place in the competition.

The trial was arranged along a five-mile path at the top of a nearby mountain and included several points where competitors were required to stop and test their soldierly skills. The points included: M-16/A2 assembly/disassembly, land navigation and

(See Ranger Style, page 31)

Focus on Soldiers

Contributions from the Field

RED CROSS

NATIONAL GUARD

RANGER STYLE

COBRA GOLD

Ranger Style ... from Page 29

map reading, buddy carries, grenade throwing, M-40 Protective Mask usage, and employment of the M-18 Claymore Mine. Soldiers were evaluated on their ability to perform the tasks properly and complete the course in the shortest possible time.

"It was fun, challenging, and an excellent way to spend a German morning," said SSG Kenneth Demars. Demars took top honors in the contest by finishing all the points and the five miles in 51 minutes. Second place went to SPC Cosme Lavalle, with a time of 54 minutes, and Shockley's 55 minutes netted third place.

The competition was a precursor to more intensive tasks that C Company will implement next year.

"I love the ideals, the competitiveness, and the sharpened soldier skills that are fostered by the 'Best Ranger' competition, said CPT Lan Dalat, C Co. commander.

"I want to import some of the same ideals into this unit and garner similar results. This has the potential to be an excellent team building tool, as it increases a soldier's proficiency at wartime tasks and promotes a high degree of fitness — all under the guise of fun."

Submitted by SPC Bradley D. Morrow, C Company, 1st Satellite Control Battalion
(See photo on page 30 RANGER STYLE)

Clockwise from top left: SSG Sean McGrane, Photo by MAJ Robert Zaza; LTG Roger C. Schultz, director, Army National Guard, spends time with mobilized soldiers of his component, CPT Angie Tofflemeyer and CPT Andy Riordan, both of the 193rd Space Support Battalion, Army Space Command, and serving in support of Operation Enduring Freedom. Photo by DJ Montoya, Army Space Command; SPC Pratan Ratanapinta, Photo by SSG Franklin Barrett; SSG Kenneth Demars, Photo by CPT Lan Dalat.

Ribbon Cutting ... from Page 25

seem to provide space for docking starships, a design similar to TRADOC's training barracks which are dubbed "Starships."

A headquarters building for Army Space Command was officially requested in 1987, and the original concept called for it to be built on Fort Carson, Colo., with a 35,000 square foot design. The building "grew" to its present dimensions of slightly more than 100,000 square feet due to the ever-increasing number and size of missions that the Army performs in Space.

"We're very proud of this new building," said Hugh Mason, Director of Public Works, Army Space Command.

"It is without a doubt the most modern building in the Army inventory. And everything about it, from its design, to its color, to its location — make it a fitting home for a command that is of increasing importance to the Army and to the nation."

Mason has been with the command since 1989, and has been a driving force on the new building project practically since its conception.

"Without a doubt, this is my 'career project.' People are very excited about moving into this building, and I am personally very very proud to have been a part of it from the beginning. Now, to finally see it opening … "

At a cost of $26 million, the building will house all operational and administrative elements of Army Space located in Colorado Springs.

"One of the greatest aspects of this building is that we will be able to train, prepare, and deploy operational assets, either for training or actual operations, right from the building to the airfield," said Mason.

Tim Lynch, deputy operations officer for Army Space, who also has been with the building project since its inception, summed it up.

"The whole concept of a Space complex, in which we work closely with our Air Force counterparts, the Navy Space elements that we'll also house in our new building, plus our colleagues at NORTHCOM in Building Two, and the great Space technology base of this area, is now come to fruition, with the opening of Army Space Command's new home," said Lynch.

MAJ Laura Kenney is a mobilized reservist currently serving in the Army Space Command Public Affairs Office in support of Operation Enduring Freedom. She served five years Active Duty as an enlisted journalist with Air Defense Command in Germany. As a commissioned Reserve officer, she performed in Public Affairs in the Gulf War theater, and served as deputy public affairs officer for the American sector in Kosovo in 2001.

Support from the Sanctuary:
Exploiting the ARSPOC

By LTC Mary J. Miller

Track vehicles crunching over rocks, rotor blades slicing the air, blistering sun, and freezing nights — a typical scenario for an Army exercise. But not in the Army Space Operations Center (ARSPOC).

The ARSPOC is the operations center for the Army Space Command and the U.S. Army Space and Missile Defense Command. From its foxhole, a high-tech center in Colorado Springs, Colo., the ARSPOC provides 24/7, real-time command and control of Army Space Command assets and situational awareness through global and regional communication resources. It brings Space expertise to the fight from the sanctuary of a home station.

The ARSPOC is manned by a talented crew of 21 people: soldiers from the Active Army, the Reserve Component, and a Department of the Army civilian technical adviser. Together they maintain situational awareness on the 15 permanently forward-stationed Army Space Command elements and all deployed assets, which varies regularly with real-world operations and various training exercises. They maintain regular contact with the U.S. Space Command's Space Operations Center, Cheyenne Mountain Operations Center, the operation centers for Navy Space Command and the Air Force Space Command, Joint Task Force Computer Network Operations, the Joint Information Operations Center, and the Army Operations Center.

The ARSPOC provides reachback for the Space Operations Officers stationed around the world, offering around-the-clock availability for resolution on any request for information the officer may have. This intensive level of support is provided for real-world operations and exercises alike. The ARSPOC maintains a parallel set of databases and Web sites for recording and tracking both real-world and exercise events and requests for information. This process facilitates information flow and timely responsiveness and reduces the possibility of confusing real-world events with exercise events.

As Millennium Challenge 2002 (MCO2) planning conferences advanced, the SMDC Battle Lab (SMDBL) approached the ARSPOC about advanced play in this exercise. In our discussions with them, we quickly realized the benefits to be gained by participating in more than the traditional exercise role normally assumed by the ARSPOC. This operations center is charged with managing a vast amount of information in a technologically rich environment that is rapidly evolving. MCO2 offered an excellent opportunity to experiment with new systems and methods for better managing the missions. We agreed and invited them in to see how the ARSPOC could improve reachback support to field users.

The four crews of ARSPOC soldiers would participate in MCO2 alongside their Joint Service brothers, but their weapons would not be the traditional major end-items. Instead, they would wield the Space Battle Management Core System, Global Command and Control System, Terrestrial Critical Command Circuit, and the Defense Satellite Communications System Network Planning System. They would maintain communications with deployed Army Space Command elements, Space Operations Officers, and the exercise control group. Most importantly, they would incorporate new technologies into the mix that could prove to be valuable in the future as real-world missions increase.

Before the exercise kicked off, all ARSPOC crews received briefings from SMDBL personnel on exercise

From its foxhole, a high-tech center in Colorado Springs, Colo., the ARSPOC provides 24/7, real-time command and control of Army Space Command assets and situational awareness through global and regional communication resources.

and experiment objectives, and training on equipment to be tested on the operations floor. The ARSPOC would test a new method of pushing imagery to field users, which would shorten response time for imagery requests. A common operating picture software package would be tested that would give them parallel visibility on the exercise while maintaining real-world situational awareness and mission control. A Space operations system program identical to the ones in use by fielded Space Operations Officers and the experimental Space Support Element was loaded on a laptop computer. It would be positioned in the ARSPOC to test it as a possibility for more streamlined communications with forward Space support personnel instead of the traditional Space Battle Management Core System. Finally, a previously unexplored video conferencing capability was installed in the operations center to be tested and evaluated for possible purchase and permanent installation in the ARSPOC.

All of these experiments were carefully designed to support four of the seven Army Space Command goals for this exercise: (1) evaluate Space operations in the transformation force model; (2) provide the SSE with command and control and battle management in order to supply supported forces with Battle Mountain Command, Control and Communications capabilities (not just force enhancement); (3) enhance appropriate command and control for Army Space Command supporting a theater combatant commander; and (4) evaluate virtual collaboration and reachback.

A small video camera was set up on the Non-Secure Internet Protocol Router Network computer to give us the ability to hold direct video conferences with SMDBL, forward at Fort Bragg, N.C., using Microsoft Net Meeting. This popular device is common in corporate America and quickly demonstrated its value to Army Space Command. This capability was tested successfully on many occasions and proved to be a tool worth incorporating into the ARSPOC for permanent use.

The imagery-handling experiment also was successful, although more in concept than in practice. While imagery was pushed from spectral operations teams to the ARSPOC, we did not feel the entire process, from requests for information to retrieval to response, was sufficiently tested. There were not enough requests for imagery to the ARSPOC, which we believe was a result of requesters not realizing they could go to the ARSPOC for this type of reachback support. This is an area that could benefit from better advertising of the capability before further testing of the concept in future exercises.

As the exercise progressed, the ARSPOC handled numerous requests for information from a wide variety of players. As requests were received, the soldiers answered the queries or called upon the on-call subject matter experts to provide the correct information. They forwarded the responses in a timely manner through the exercise control group to the requester. The software application that was loaded on the Space Battle Management Core System provided ARSPOC operators a common operating picture which was shared with SMDBL, located more than 700 miles away at Fort Bragg. This gave crews a complete picture of the exercise to set side by side with real-world operations. Filters were employed to ensure that the two were not confused. This tool proved to be very valuable from the standpoint of event deconfliction. It significantly reduced the possibility of erroneously confusing

(See ARSPOC, page 46)

The Space Battle Captain:

Managing the Future of Tactical Space Operations

"All the products of Space — navigation, communication, warning, and intelligence — will be key products for the U.S. Army Objective Force, which will be a much lighter and more lethal force. And for it to accomplish this mission, it must be able to see first, understand first, decide first, and then finish decisively. And Space will enable that force to do that."

— LTG Joseph M. Cosumano Jr., commanding general of the U.S. Army Space and Missile Defense Command, Aug. 03, 2001, Colorado Springs, Colo., speaking to the first graduating class of the Functional Area 40 (Space Operations Officer) Qualification Course.

By CPT Bob Barrett and 1LT Angela Johnson

LTG Joseph Cosumano's above statement summarizes the mission given to the Space Support Element (SSE) during Millennium Challenge 2002 (MC02). To accomplish this mission, the soldiers from Army Space Support Team 5 (ARSST 5) were transformed for MC02 to an SSE with the responsibility to provide full-time presence and Space-related tactical support to the Army Forces headquarters (HQ). Ensuring a smooth and effective transition from an ARSST to an SSE was one of the main duties of the battle captain during MC02. The battle captain was one of the key integrators and managers of information for the SSE during MC02 and shared the SSE mission to increase the situational awareness of the Army Forces HQ.

In order to appreciate how the SSE and the battle captain accomplished this mission, it is necessary to understand the reason why the SSE participated in MC02. Doctrinally, the SSE is the primary U.S. Army Objective Force headquarters staff element responsible for providing full-time presence and Space-related tactical support to the division. The SSE is also the subject matter expert for Space planning, capabilities, and operations at the division level. The SSE was utilized by the Army Forces HQ not only to support its mission, but also to gain insights and determine requirements for the future Space support element. In order to gain these insights, six soldiers from the ARSST 5, from 1st Space Battalion out of Colorado Springs, Colo., were transformed into an SSE.

An ARSST is normally composed of six soldiers that provide capabilities, expertise, and products in support of the warfighter for planning and executing the full spectrum of today's military missions, from exercises to real-world operations. ARSSTs normally deploy from 1st Space Battalion, Colorado Springs, Colo., to a corps HQ with a standard suite of equipment consisting of a Space support platform, a plotter, a precision lightweight global positioning system receiver, and three laptops that have imagery, Space modeling, and analysis software loaded onto them. In order to transform into an SSE, ARSST 5 had to learn nine new and experimental software programs on two different platforms. The battle captains were key to accomplishing this transition as they helped schedule training on the new equipment and software. The battle captains helped write the tactics, techniques, and procedures (TTP) that switched a chief function of an ARSST from providing products (producing maps, three-dimensional (3-D) fly-throughs, global positioning system accuracy reports) into an SSE that provided expertise, advice, and liaison on Space-related issues while aggressively including Space in the Army Forces parallel planning process. The position was identified for MC02 because of the difference in mission focus between an ARSST and an SSE. The requirement for the battle captain as an information manager also was identified and allowed the SSE to better accomplish its mission.

The SSE's mission during MC02 was to provide full-time presence and Space-related tactical support to the

PHOTO BY DEBRA VALINE

A Space Support Element is partially concealed during Millennium Challenge 2002 at Fort Bragg, N.C.

Army Forces that centered on subject matter expertise for Space planning, capabilities, and operations. The battle captains were key to this mission as they were involved in writing a division-level Space intelligence estimate as well as a Space annex. The battle captains also helped provide other services to the Army Forces including analysis of Space weather effects, 3-D fly-throughs, 3-D perspective images, and analysis of enemy Space capabilities. The services provided by the SSE contributed to the ability to see first, understand first, decide first, and finish decisively.

The SSE and the battle captains also educated Army Forces staff about available Space-based capabilities — an important part of the mission. Oftentimes, the battle captains were the first to greet visitors into the Space Support Element Toolset and give them answers or direct them to someone who could answer their questions or product support requests. The battle captains usually set up or assisted in the set-up of briefings to Army Forces staff and distinguished visitors. Educating the staff and visitors was essential to supporting the Army Forces in gaining the situational awareness to be the first to understand what was happening on the battlefield, thereby allowing the Army Forces to act first.

Once the simulated campaign began, the SSE was split into two shifts that had a battle captain always on duty to maintain control over the information that drove the SSE's current operations. The battle captains received, reviewed, and assessed all requests for information and products from the various Army Forces staff members. It was their responsibility to ensure that all requests were routed to the appropriate personnel to address and resolve the request for information in a timely manner. It was not unusual to see the on-duty battle captain talking to higher headquarters on the headset via the information work station while reading an e-mail, and logging in a visitor's walk-in requests for information. In addition to tracking and quality-checking incoming requests for information, the battle captains were responsible for submitting the SSE's requests to the various higher headquarters. The request for information process that the battle captains maintained helped the Army Forces gain greater situational awareness of the battlefield.

The battle captains were responsible, along with the noncommissioned officer in charge, for the day-to-day operation and maintenance of the Space Support Element Toolset. The battle captains were responsible for maintaining the SSE status board, which listed the communications status within the SSE and externally. Because the communications status was probably the most important piece of information on the status board, it was vital for the battle captains to ensure that the SSE was connected. The battle captains were not experts in many of the communication systems themselves, but were familiar enough with them to identify a problem and find someone capable of resolving it quickly. One of the ways the battle captains maintained situational awareness over the status of communications was to go through a list of the systems at the daily updates and ensure that experts in those systems were present to answer questions in case a link in the communications network was down. This communications network was vital to the battle captains, as they had to check three different e-mail accounts, four types of phone lines, and secure and nonsecure Internet connections. Without this connectivity, the SSE's ability to support the Army Forces would have been diminished.

The battle captains were also responsible for enforcing the daily battle rhythm. This battle rhythm was valuable in providing day-to-day guidance and reminders on information and products that had to be produced at a certain time each day in order to parallel the planning rhythm of the Army Forces. The daily battle rhythm was a minor,

(See Battle Captain, page 47)

Tomorrow's Joint Space Support for Today's Warfighter

By Matt Scott

The U.S. Space Command recently was given an unprecedented opportunity during Millennium Challenge 2002 (MC02) to test and validate a new design that provides Space, computer network operations (CNO), and information operations (IO) support to the warfighter. This new design is called the Space and Information Operations Element (SIOE) and is designed to be a team of experts staffed to support combatant commanders during times of hostility.

MC02 was the largest Joint experiment of its kind ever carried out and was intended to test various new warfighting concepts developed over the last couple of years. MC02 involved more than 13,500 military and civilian personnel, live field maneuvers, and computer simulations for a three-week-long experiment. It was held at 26 different sites, 17 computer simulations and nine live action sites, throughout the United States. The live sites ranged from the Command Ship USS Coronado located off the coast of California, to the sands of the National Training Center, Fort Irwin, Calif., to the high tech environment located at Joint Forces Command (JFCOM) in Suffolk, Va.

MC02 offered U.S. Space Command a chance to experiment with an innovative construct for the command and control of Space, CNO, and IO forces within the Combatant Commander and Joint Task Force (JTF) Headquarters (HQ). An 18-person SIOE was embedded into the staffs of the combatant commander and the Joint Task Force Commander (CJTF) to provide enhanced support for the following concepts: rapid decisive operations, effects-based operations, and operational net assessment. These concepts were tested by JFCOM during MC02.

U.S. Space Command had a number of experimental objectives for its SIOE concept during MC02:

- Validate the SIOE concept in support of rapid decisive operations and effects-based operations in a collaborative environment.
- Refine goals, objectives, and the way ahead for Pinnacle Pathway and other transformation events.
- Expand visibility for CNO and IO within the Joint experimentation process.
- Provide the supported commander a focal point for Space, CNO, and IO.

Centralize command and control for disparate Space, CNO, and IO elements.

Additionally, it was key that U.S. Space Command interests were represented at the Joint Coordination Board and that Space, CNO, and IO were synchronized with traditional fires. U.S. Space Command wanted commanders to be presented with Space/CNO/IO effects equivalent to air, land, and sea effects.

U.S. Space Command had members located in three different locations. There were IO and Space planners located with the JTF HQ in Suffolk, Va.; Space planners located with the air component at Nellis Air Force Base, Nev.; and a reachback cell located at Peterson Air Force Base, Colo. The SIOE team members were made up of military and civilians from all four services. They were experts in their respective fields of Space operations, IO, intelligence, and CNO. Two Army Space Command personnel were members of the SIOE: one was deployed to Suffolk, VA as a Space planner working in the JTF plans cell and the other was deployed to Nellis Air Force Base as a Space planner.

The experiment used a new construct for the organization of Space and IO. Space, IO, and intelligence were all placed under the JTF information superiority group. The idea behind this grouping was to allow these groups, all of which are information intensive, to better synchronize their plans and execution and thereby reduce redundancy, decrease planning time, and prevent different organizations from working at cross-purposes.

At the JTF level, the Space planners worked in two different cells. Two planners worked in the plans cell under

The Information Operations side of the Space and Information Operations Element team was involved in the planning and execution of an elaborate IO campaign plan that was critical in reaching the desired JTF effects and showed great promise in reducing the length of future campaigns.

the lead air planner. Their task was to integrate Space operations into the CJTF's overall plan, provide a Space operations perspective during various collaborative meetings, and provide Space operations information to other plans cell personnel. Two other Space planners worked in the JTF Operations Center where they kept track of current Space-related operations such as missile attacks, satellite communications jamming, etc., and provided Space operations perspective to the JTF Operations Center.

The majority of the SIOE members located with the JTF were IO planners. Their primary tasks were to synchronize IO activity and tasks with organizations outside of the JTF, maintain and update the operational net assessment, assist in the development of the effects tasking order, integrate information effects into the overall mission, assess the effects of IO actions, and identify intended, and possible unintended, reactions.

To allow the SIOE to have visibility at the highest levels, the SIOE team chief was made a brigadier general and assigned as a member to the combatant commander's staff in Suffolk, Va.

The SIOE team members located at Nellis Air Force Base were critical liaison officers with the Joint Force air component commander Space and information counterparts. Under the Joint Expeditionary Force Experiment 02, the Air Force looked at the doctrinal role of the Joint Force Air and Space Component Commander (JFASCC). The JFASCC is an Air Force service concept. The JFASCC concept, as well as the JTF commander, assigned all Space missions to the JFASCC. SIOE personnel at Nellis formed a bridge between Space/IO planning at the JTF and Space/IO planning at the JFASCC. Examples included coordinating Joint IO assets into the air tasking order and Army Space assets into the Space tasking order. In accordance with the recently approved Joint Publication 3-14, Joint Doctrine for Space Operations, the functions executed by the SIOE at Nellis in the future will occur under the designated Joint Force Space Operations Authority.

The SIOE reachback cell was located at Peterson Air Force Base. This cell allowed the deployed SIOE members to have access to U.S. Space Command's component expertise. If a Space planner with the JTF HQ at Suffolk, Va., had a Space-related question, he could contact the reachback cell with the question. The reachback cell then would answer the question from the knowledge base located at U.S. Space Command or, if the answer was not available, the cell could engage a U.S. Space Command component for the answer. This design kept the number of deployed SIOE team members relatively small, but still retained the ability to access the entire scope of Space expertise throughout the U.S. military.

On multiple occasions the JTF commander was briefed on Space issues and what Space assets could do to help the CJTF achieve his desired effects. This in turn allowed the CJTF to gain visibility on the complexities of Space operations. Numerous JTF members (Army and Marine Corps combat arms types) who had never been exposed to Space capabilities other than navigation and communication support also were given a chance to see what Space could do for the JTF as a whole.

Information operations were not considered a focal point by experiment planners prior to MC02, but became important early on because of CJTF emphasis. The IO side of the SIOE team was involved in the planning and execution of an elaborate IO campaign plan that was critical in reaching the desired JTF effects and showed great promise in reducing the length of future campaigns. The CJTF was briefed twice daily on the IO campaign and was very engaged in the development and execution of the IO plan.

MC02 was designed as a spiral process. The spiral process is a series of ever more complex scenarios culmi-

(See Joint Space Support, page 48)

MC02 and the Tactical Exploitation System Family

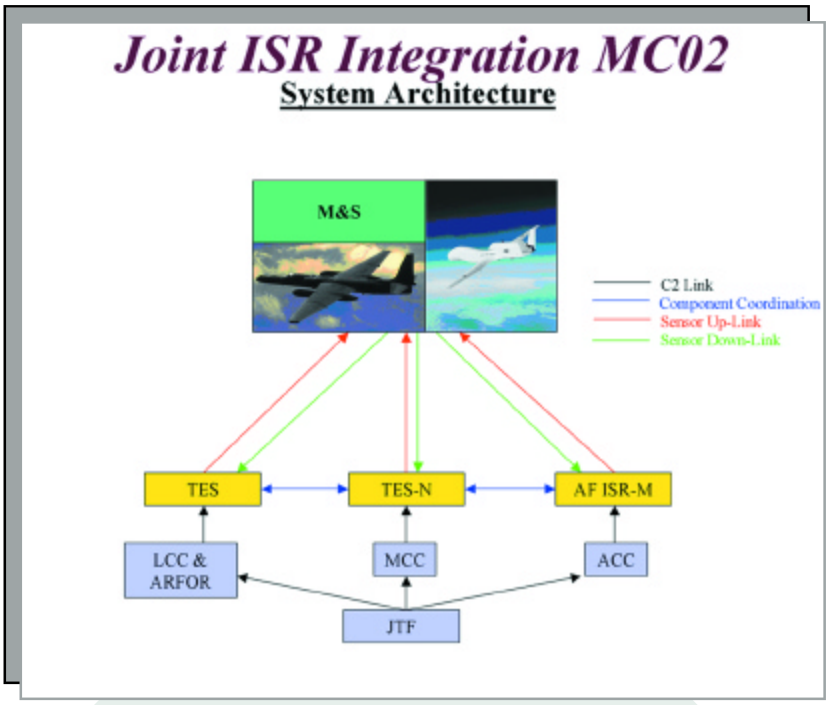
By Robert F. Donohue Jr.

Imagine Navy imagery analysts peering at a U-2 image on their workstations. They are onboard the USS Coronado docked in San Diego, speaking to Air Force imagery analysts at Nellis Air Force Base, Nev., about the mission profile. Both have the same image on their workstations. Was this only possible as a simulation product during Millennium Challenge 2002 (MC02)?

The Army Space Program Office doesn't believe so. It has envisioned such a real-world capability ever since the development and fielding of the tactical exploitation system (TES). With the services beginning to field TES equivalents (TES-N for the Navy and ISR-M for the Air Force), a truly interoperable intelligence, surveillance, and reconnaissance system is now close to reality. This conclusion became very apparent to many interested in intelligence surveillance and reconnaissance because of a Joint collaboration between the Army, Navy, and Air Force during MC02. How did this happen?

The story begins in 1998 with the Army Space Program Office initiating work to inject tactical exploitation of national capabilities (TENCAP) systems into simulations and exercises. Working with the Office of the Secretary of Defense's Joint Technology Center, System Integration Laboratory out of Huntsville, Ala., the Army Space Program Office designed such a system called TENCAP multiple unified simulation environment (MUSE). TENCAP MUSE was patterned after the System Integration Laboratory's unmanned air vehicle simulation just called MUSE. The laboratory and the program office worked to refine the capabilities of the simulation to emulate theater and national platforms and the Army's real-world TENCAP capabilities. The Air Force joined this collaboration afterwards, and a multiservice partnership was formed. Today the simulation can emulate several theater and national platform intelligence products and push these products to the TES, or as MC02 proved, to the entire TES family of systems. For MC02, the two main platforms that the simulation emulated were the U-2 and the Global Hawk. Initially, the Army proposed operational play of its TES during MC02 supplemented by TENCAP MUSE. Because of Operation Enduring Freedom needs, the U-2 and Global Hawk play for MC02 fell to simulation only using TENCAP MUSE and the Air Force's duplicate model called Air Force synthetic environment for reconnaissance and surveillance.

Following current doctrine, the Air Force used the synthetic environment as the primary feed for the U-2 and the Global Hawk. Its system operated from Hurlburt Field, Fla., and fed its ISR-M at Nellis and the TES-N. The Army Space Program Office system was located in San Diego to feed the Navy's TES-N and simulated Army TENCAP systems that would ordinarily be available. Because of operational needs, no Army TENCAP systems were available and TENCAP MUSE fed the Global Hawk-Maritime for the Coronado and performed the backup role for the U-2 and the Air Force's Global Hawk. When technical problems were encountered at various times at Hurlburt, the ASPO system was used to drive the real-world TES family of systems until



these problems could be worked out.

Whether in a virtual environment such as MC02 or in real-world operations, the complementary capabilities of the TES family of systems exist, as demonstrated during the exercise. Additionally, the Army and Navy desired that Joint Forces Command emulate passing of U-2 sensor control during the exercise. This was an additional role for TENCAP MUSE. It was planned and tested, but not played during MC02. The figure above portrays the virtual intelligence, surveillance, and reconnaissance integration concept planned for MC02.

Since MC02 did not play the important role of Joint sensor handoff, what was proven? First, U.S. Army Space and Missile Defense Command proved when technical problems were encountered that the simulation could support doctrinal experimentation. Although we virtually generated the imagery from two different "locations" in MC02, the same thing could happen in real-world operations between the TES and the ISR-M should something happen to one of the systems. Second, in discussions prior to the exercise, the model's capability forced questions regarding sensor control and how to develop Joint tactics, techniques, and procedures.

This development will continue in Terminal Fury 03, a not-too-distant Joint exercise in the Pacific, where sensor control will be a critical task to exercise. Importantly, MC02 also demonstrated how a TES family of systems could form the basis for the services' Distributed Common Ground System (DCGS) concept. All DCGS systems can share products from forward as well as "rear" locations. Finally, by generating imagery that required analysts in the exercise loop, the simulation also demonstrated the need for federated (system of systems) exploitation and continued needs for training in those processes.

Too often, in exercises, staffs incorrectly learn that they can expect an overwhelming amount of intelligence detail almost instantaneously. Analysts and commanders learned quite a bit about their capabilities to read-out this data. One might ask, could MC02 have exercised some of these concepts with national systems? The answer, as we have demonstrated in numerous other exercises, is yes.

As demonstrated in MC02, the tactical warfighter does not belong to a single service, but to several. The TES family of systems, as SMDC's contribution to the service's DCGS concept, will lead to development of Joint tactics, techniques, and procedures that will enhance the battlefield commander's ability to exploit our nation's Space capabilities. By using already developed simulation tools to train our staffs now, we can pave the way for the Services to optimize how they interact and move toward the goal of an interoperable DCGS concept.

Rob Donohue works as a Northrop Grumman contractor for the Army Space Program Office. He has been working Tactical Exploitation of National Capabilities (TENCAP) simulation efforts since 1998 and has been a driving force in its development. Prior to his work with Northrop Grumman he spent more than 12 years in Air Force modeling and simulation activities.

The Global Aspect of Space Exercise Control

By Owen B. Carleton

This year's Ulchi Focus Lens-02 (UFL-02) exercise, conducted by U.S. Forces Korea, provided an excellent opportunity to integrate and coordinate all Space activities in support of a major theater Joint warfighting event. This exercise was truly unique from the Space perspective in that the U.S. Space Command, Army Space Command and Air Force Space combined their abilities and resources into a cohesive Joint Exercise Control Group. Each command provided Space expertise within its core mission areas while manning the Exercise Control Group in Korea. We simultaneously exercised reachback capabilities at home station to support request for information requirements from the field. Exercise updates were posted to Air Force Space Web page using the Space Battle Management Core System (SBMCS) exercise database. This gave Space forces in the field a location on the SIPRNET for current Space status and realistic Space order of battle, thereby furthering Space situational awareness.

At first glance, one might not consider interservice, Joint coordination and cooperation a significant milestone in exercise management. That is, not until one realizes the global and interservice effects of Space scenarios during a theater-level exercise. Over the past three to four years, there has been a steady increase in the amount of Space play during theater-level exercises. However, while Space play has increased, it was parochial in nature with each of the separate services doing their own thing. This created inter-service stovepipes within Space scenario events causing confusion and misunderstanding on the part of the Joint warfighting staffs.

On a number of occasions in the past, a Space event was not thoroughly coordinated across the Joint Space community, resulting in confusion as to the purpose and desired outcome of the event.

An example of an uncoordinated event might follow this typical scenario. The 7th Air Force in Korea desires to exercise the staff communications planning officers. Exercise controllers determine that the injection of a solar flare event will cause sufficient disruption of communications, specifically the loss of a transponder on a commercial satellite, warranting corrective action. The intended training objective and audience for the solar flare event was to get the 7th Air Force staff to initiate a request for reallocation of affected channels.

In order to accomplish this action, the staff must request a change of channels or, if necessary, a change of satellites from the higher headquarters, U.S. Forces Korea in this instance. This will require the staff to deconflict channel allocations, thereby involving the Regional Satellite Communications Support Center and the Defense Information Systems Agency. This in turn will affect other 7th Air Force units in-theater. It could also affect communications if there is a shortage of Satellite Communications channels in the region.

This example could easily affect other systems in-

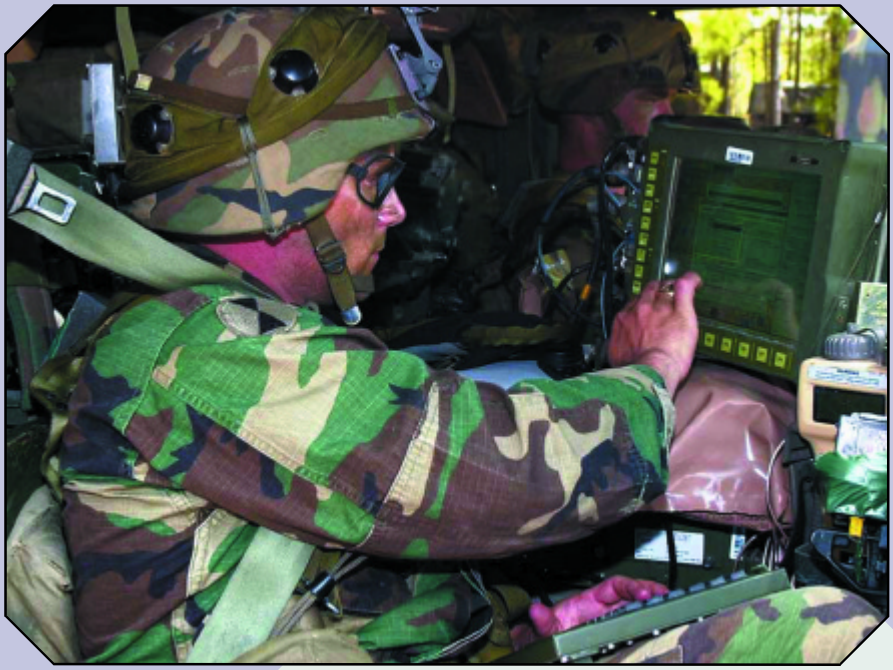


PHOTO COURTESY U.S. ARMY

Joint exercises of the magnitude of Ulchi Focus Lens 02 allow the testing of interservice effects of Space scenarios on the theater level. From individual soldiers using Space products for land navigation purposes, as shown in the picture to the left, to the larger 'picture' of interservice communications, Space plays a critical role.

theater or around the world. We will halt the example at this point. However, one can see through this example that if a Satellite Communications event is not coordinated with other exercise controllers and/or staffs, confusion sets in. No one except the initiators of the event are truly aware of the ramifications and the intended outcome.

The inherent global nature of Space makes it impossible to exercise Space events in an isolated environment. Having the three major Space commands synchronize their Space master scenario event requirements, and then execute the scenario injects from a centralized location, greatly decreases confusion to exercise Space player cells and warfighting staffs responding to the events. The centralized control of Space inject events also encourages the coordination and actions of all Space forces deployed in-theater, which is a tremendous side benefit.

From an exercise controller perspective, having the opportunity to tap U.S. Space Command strategic planning expertise and Air Force Space Command's Space operations background helped establish stronger relationships for future operations and exercises. In addition, having the ability to utilize a coordinated Space order of battle and global positioning system accuracy predictions proved invaluable to the deployed Space forces as well as the exercise controllers.

Air Force Space provided a realistic Web page which they updated daily with the status of our Space support enhancement and control systems, the current enemy Space situation, and terrestrial and solar environmental data. Rolling all of this into one package gave the deployed Space forces one place to get all the relevant Space information. This will cut down on miscommunication and misrepresentation of the Space situation to the warfighter, making Space forces a more valuable asset.

Clearly, U.S. Space Command, now U.S. Strategic Command's contributions to this exercise were significant. It will be interesting to observe the transition U.S. Strategic Command will make as it applies lessons learned to the new command, its missions, and organizational structure. However, the desire from this analyst's perspective is to make the Joint Exercise Control Group, established during UFL-02, the standard for future theater exercises. Planning for the incorporation of other Space assets should include representation from Joint information operations and the integration of air and missile defense. Incorporating all Space capabilities in these critical mission areas will allow the Joint Exercise Control Group to exercise all Space mission areas in an integrated, synchronized manner.

Owen Carleton works for the G2, Army Space Command, as the chief of the Integrated Air and Missile Defense Division. He retired from the Army as a CW4 after 28 years in the Military Intelligence Corps. His professional experience includes Army Space G2 exercise specialist, the senior intelligence analyst in the Army Space Theater Missile Defense Tactical Operations Center, and numerous positions on intelligence staffs from division to Theater Armies.

MC02 — Normalizing Army ... from Page 5

sion making process using a six-man Space Support Element and their toolkit. During the experiment, the composition and tactics, techniques, and procedures of Space asset support to the Army Forces were closely examined. The SSE brought tremendous value-added to Army Forces effects-based planning and became an integral member of the planning community and effort. The SSE toolkit's internal wideband satellite communications provided reliable, effective reach back capability as intended. Additionally, the development and operation of the Space Applications Technology Utility Research Network (SATURN), the Wireless Web-based Warfighter, the Space Operations System, the Embedded National Tactical Receiver, and Broadcast Request Imagery Technology Experiment provided enhanced capabilities to the Army Forces. The Spectral Information Initiative was a standout performer, receiving high praise from many senior leaders. This capability applied commercial/civil high-resolution satellite imagery, indirect field tasking, direct downlink, and advanced processing to provide greater battlespace visualization for tactical and operational users.

While Space is inherently Joint, each Service leverages Space-based capabilities to enhance its own Service's warfighting capabilities. MC02 provided an excellent opportunity to leverage Space in a Joint environment for the benefit of the Army Forces commander. We successfully integrated Space operations into Army operations and learned some valuable lessons about Space contributions to Joint operational concepts. Clearly, making Space operations a "normal" part of Army operations is transformational.

Effects-Based Shaping ... from Page 9

as they would co-exist with EBO (the length of this article precludes a discussion of sustaining operations for now). The word "co-exist" is critical because no element of EBO precludes the Army concept of decisive and shaping operations. In fact, the JTF headquarters for MC02 used a decisive and shaping construct for the operational design of the experiment. This design not only had no negative impact on the experimental objective regarding EBO, but also actually facilitated its use and improved its application by lending clarity of purpose and providing unity of effort among components. This is particularly true in terms of operational fires.

For now, EBO is primarily a joint doctrinal concept. As a high-end tactical and operational organization, the Army Corps is the first Army echelon to be potentially impacted by EBO. This is important when one considers that the Army Corps, as the operational headquarters at echelon above division, focuses enormous energy on the fires component of combat power.

The Corps can employ extremely effective fires (FA, ATK AVN, JFACC, nonlethal, etc.) as a decisive operation, shaped by maneuver forces to enable fires asset positioning and target acquisition. Fires can also be employed by the Corps to shape the depth and breadth of the battlespace in order to move divisions to positions of advantage for decisive maneuver.

The experimental concept of EBO is mutually supporting of the capstone Army concepts of Task and Purpose and the Decisive, Shaping and Sustaining construct. Under EBO, units can and will continue to be given destroy, defeat, and other doctrinal tasks. The supremacy of purpose will be retained and strengthened through the quantification added by the stating of desired effects. The construct of D/S/S operations is completely compatible and interoperable with EBO and there is emerging evidence that EBO will provide opportunity for significant enhancement to future Army operations.

We are a doctrine based Army, and our transformation to the Objective Force will require new and innovative doctrinal approaches. EBO provides a potential path for harnessing the power of Objective Force capability, and, as such, additional Army and Joint warfighting experiments should aggressively pursue the transformation of our doctrine to an effects-based approach.

Healthy skepticism regarding new concepts is good for our Service and our profession. In regards to EBO, we will be well served by focusing our energy on ensuring that the best of our doctrine shapes this future Joint doctrinal concept. Resisting EBO outright as new and unnecessary would be a disservice to our Army, the Joint community, and our profession.

As we move forward in Objective Force development, let's take a good hard look at EBO. And, as we pursue EBO, we'll inevitably have to consider the Effects Tasking Order (ETO), but that's another story!

PHOTO BY TSGT JOHN E. LASKY, USAF

The largest joint exercise in history, Millennium Challenge 02, tested all facets of the warfighters' repertoire. Key among them were Space capabilities, as pictured in these photographs taken during actual operations. Above: In southern Bosnia-Hercegovina, — SPC Matt Cohen and SGT Willie Davis prepare to call back to Stabilization Forces Headquarters via the Portable Satellite Communication System. Below: Deployed soldiers use portable satellite links to communicate with their headquarters.

PHOTOS BY SARA M. WOOD

Mission Area ... from Page 3

and are discussed in detail elsewhere in this publication.

Finally, I want to address the recent changes to the Unified Command Plan that impact those of us working Space-related issues. As part of the ongoing transformation of the U.S. military into a 21st Century fighting force, on Oct. 1, 2002 the Department of Defense disestablished U.S. Space Command and U.S. Strategic Command and created a new U.S. Strategic Command at Offutt Air Force Base, Neb., combining the missions of both into one headquarters. Additionally, the Unified Command Plan assigns the four previously unassigned mission areas of globally integrated missile defense, global strike, information operations and Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance to the new U.S. Strategic Command. The fact that Space ties these mission areas together was clearly a factor in placing them all under this new command.

The new U.S. Strategic Command provides the nation a single combatant command with global perspectives, focused on exploiting the strong and growing synergy between strategic capabilities and the domain of Space. In fact, its commander, Admiral James O. Ellis Jr. says: "I submit to you that what are often described as Space capabilities can easily be viewed as part of the nation's strategic capabilities."

What we are witnessing and participating in is a change in outlook — a change in the way we think about, prepare for, and conduct war. For the first time, most every capability of modern warfare will be resident within one command — this is a decidedly bold, new idea, one that has the potential to serve the nation well for decades.

The next few years will be an exciting time in the Space mission area. Each day brings with it new revelations of the vast potential Space holds. During the Oct. 9 ribbon-cutting for our new Army Space Command Headquarters facility on Peterson Air Force Base in Colorado Springs, I quoted Ralph Waldo Emerson, the American essayist, poet, and philosopher, who eloquently captured the essence of new beginnings when he wrote — "I had an almost intolerable awareness that every morning began with infinite promise. Any book may be read, any idea thought, any action taken…. On a day no different from the one that has just begun, Shakespeare sat down to begin writing Hamlet." As you read through the articles in this edition of The Army Space Journal, I hope you will think about what you are doing today, and what you are going to do tomorrow to leverage all that Space can do for our military.

SECURE THE HIGH GROUND

Eye of the Beholder ... from Page 15

planning were the critical factors that led to the SSE's success with the Army Forces and MC02 in general. The FA 40 had to be able to continually articulate (in English, not Space speak) how Space operations and, particularly, Army Space Command assets could augment and force-enable Army Forces and ultimately Joint Operations.

"Can you please move that satellite for me?"

During MC02 there were no questions like the above sub-title. The powers that be at Army Forces had open minds and a desire to use all available assets to better their operations. Their inherent level of technical and tactical competence was impressive and made the SSE's job that much easier. The smattering of Space smart officers assigned to the Army Forces was a huge asset for the SSE and hopefully, a precursor of things to come.

Recap FA 40 insights

- Conduct face to face advocacy, education, and literacy as early as possible.
- Build habitual relationships with the supported headquarters, staff, and commander.
- Plan within the supported unit's planning/decision cycle, then expand the planning cycle to be as proactive as possible.
- Seek out the G5 IO element — Space operations are entirely complementary to IO.
- Stress Space as an enabler and supporter to the battlefield functional areas.
- Follow up on services and products, never stop improving and refining them.
- Get Annex N done early, develop an appendix to the intelligence annex (if applicable).
- Use the ARSPOC.
- Use the SORC.
- Learn and understand the Joint Space assets available for the area of operations.
- Continually market Space technology, systems, and capabilities.
- Normalize Space operations.

MC02 provided a near future (2007) venue to test, experiment, and validate concepts, technologies, and doctrine on how the Army will most likely use Space operations for the Interim Force, and clearly showed why the Army will increase reliance on Space capabilities for the future Objective Force.

LTC Brad Baehr serves as the chief of concepts and initiatives for the Space Directorate of the Army Space and Missile Defense Battle Lab. His professional experience includes Field Artillery MLRS Battalion Executive Officer and multiple firing battery commands in the Continental U.S., and Korea. He served as Special Assistant to the Chief of Staff of the Army and as liaison officer to the French Army. He is a qualified Space Operations Officer.

Field Impact ... from Page 11

Space Support Element. Baehr is the senior Functional Area 40 officer for Millennium Challenge 02. "Army Space, the Space and Missile Defense Battle Lab and Force Development Integration Center have formed a strong team of soldiers and civilians coupled with leading-edge technology and operational concepts to support the SMDC MC02 initiatives."

This idea of a Joint Force having the rapid access of gathered and stored information to predict an adversary's actions would dissuade potential enemies and implement diplomatic solutions before events escalate to war.

"These initiatives will lay the groundwork for Space operations in the future," said Kurt Reitinger, the Space and Missile Defense Battle Lab experiment manager. "The experiments we are conducting here are key to the next several years of development. It's great that SMDC can play such an important role."

Overall, four of the 12 Army initiatives are being sponsored by SMDC. The Tactical Space Initiative, which includes the Broadcast Remote Imagery Technology Experiment (BRITE) and the Embedded National Tactical Receiver (ENTR), examines the composition of tactics, techniques, and procedures of Space asset support to headquarters. TacSpace is an umbrella initiative that includes numerous concepts and initiatives. The centerpiece of TacSpace is the Space Support Element, which includes a six-soldier team of Space operations soldiers. This team, which is designed to be an integral part of the future division staff, provides key input to the development of the supported unit's plan. The team uses the Space Support Element Toolset, which is a collection of hardware systems and software applications, to accomplish this mission.

Other initiatives include the Spectral Information Initiative which provides mobile, commercial, high-resolution satellite imagery; indirect field tasking of sensors; direct data downlink; and advanced processing of spectral data to create improved battlespace visualization for tactical users. This initiative will evaluate Eagle Vision II, Mobile Processing/Exploitation/Dissemination (MoPED) platforms, and the Spectral Operations Resource Center. The Army Space Program Office is sponsoring the National Imagery Client and Tactical Exploitation of National Capabilities, Multiple Unified Simulation Environment (TENCAP MUSE) initiatives.

What the SSE operators do is not "sexy" as far as Army operations go. It's not as glamorous as an airborne drop or a live-fire event, but it's just as important to the success of the mission.

"We are integrating new and emerging technology into the tactical environment, such as wireless Internet connectivity," said Bannister, a member of the 1st Space Battalion. "I am responsible for ensuring voice, data, and fax communications, as well as maintaining the computer hardware and software." Bannister also produces global positioning system accuracy charts and over-fly reports from satellite imagery.

SGT Brandi Harris, a topographic analyst for the Spectral Operations Resource Center, makes maps of the battlefield from raw images she pulls down from satellites.

"We take a high-resolution image from the satellite and then draw in annotations that will help the decision-makers," Harris said. "For this exercise, we took an image of the drop zone at the NTC and drew in the flight path. We included elevation and other information that showed the warfighters in the field what they needed to know about the area." Harris is assigned to Headquarters and Headquarters Company, Army Space Command. The SORC supports the G-3.

Behind the scenes, 1LT Angela Johnson, the team's communications officer and co-battle captain, verifies that the external networks are working.

"The first thing I do is check all the phones," Johnson said. "Then I check with G-6 to see if there are any problems with their system that might affect us. We check e-mail to see if we are getting operational updates.

"The team provides warfighters with Space-based capabilities such as near real-time imagery, satellite constellation health and notional Space control," Johnson said. "This is the first time we have been part of the decision-making process at the division level. We provided more visibility with our Space Support Element. We can add value to just about every staff element because they can use the information we provide to make better decisions."

"All the products of Space — navigation, communication, warning, and intelligence — will be key products for the U.S. Army Objective Force, which will be a much lighter and more lethal force," said SMDC Commanding General LTG Joseph M. Cosumano Jr. "And for it to accomplish this mission, it must be able to see first, understand first, and then finish decisively. And Space will enable that force to do that."

Debra Valine is a public affairs specialist in the U.S. Army Space and Missile Defense Command and functions as the editor of The Eagle. She retired from the Army in 1997 after a tour as the chief of Army newspapers at the Pentagon. Following retirement, she worked for three years as the editor of the only weekly newspaper in NASA before accepting her current position in SMDC.

Experimentation ... from Page 21

Initiative teams also had to plan, coordinate, and execute training for system operators. This training was completed during the months leading up to the main experiment in July-August.

Logistics

Coordination of logistic planning proved key to obtaining appropriate support at Fort Bragg for SMDC initiatives. Initial requirements were passed to the XVIII Airborne Corps lead exercise planner several months prior to execution.

A reconnaissance of the experiment site in January proved critical to understanding exact needs. SMDC requirements then were formally requested by memorandum and they included transportation, storage, work areas, power, and maintenance support.

Lessons Learned

Multiple insights — in experimentation management and in tactical arenas — were gained by SMDC's Space experimentation in MC02. In terms of experimentation planning and management, several items were identified as vital to success:

- Initiative objectives must be specific and realistic.
- Objectives must be linked to Army experiment objectives.
- Planners must develop for each initiative a solid concept of operations and a simple chart with which to communicate (referred to as a synopsis chart).

Lessons learned range across Space functional areas and echelons of command in the DTLOMS categories. Analysis of data gathered will proceed for several months while follow-on implementation of insights may take even longer. In the near term, however, SMDC's Force Development and Integration Center (FDIC) is charged with providing a quick-look report to the commanding general, SMDC in September that requires significant input provided by SMDBL. Both FDIC and SMDBL will publish final reports by the end of the calendar year that will serve as documentation for specific DTLOMS actionable items.

Conclusion

MC02 was a big success for SMDC experimentation with more than 50 personnel deployed throughout the continental United States in support of multiple echelons of command. The experiments conducted will be key to the next several years of initiative development. Overall, MC02 was a great example of achieving the command's motto to "secure the high ground!"

ARSPOC ... from Page 33

an exercise event with a real-world event. Given that the ARSPOC continues its wartime mission in support of Operation Enduring Freedom and Operation Noble Eagle regardless of exercises, this tool became vitally important.

Due to real-world events, we were unable to position a Space operations systems in the ARSPOC. The Space Operations Officers in the field needed the computer, so there were no spares for test purposes in the operations center. As more systems are procured, we will be able to secure one for test and evaluation. This experiment is at the top of the priority list for testing in future exercises. We believe that this capability could be the shortest new path from field Space officers to sanctuary for reachback support.

These experiments provided valuable insight in how to modernize the technologies in the ARSPOC. Our work with SMDBL brought to light concepts we had not considered possible before. As Army Space Command stands ready to assume increased missions with the establishment of the U.S. Northern Command and the new U.S. Strategic Command, the need to expand our command and control capabilities is clear. We are compelled by our responsibility to the Space community and to those who use Space products to evolve into an operations center that can rapidly turn around requests for any Space-based product. MCO2 was the first step in the long-term transformation of the ARSPOC as we strive in the near term to remain equipped, trained, and ready.

LTC Mary Miller is a mobilized reservist currently serving in the Operations Division of Army Space Command G3. She served eight years on active duty and the last 13 years in the reserve component, with assignments including the 372nd ASA Company, 125th Military Intelligence Battalion, the U.S. Army Intelligence Center and a tour with Joint Task Force Six in support of the U.S. Marshal's Office in Denver.

RDO ... from Page 23

tional information, which was less than three hours old. Intelligence staff personnel stated that spectral information was a great capability that should become complementary and enabling to the intelligence effort.

The initiative assessment examined the value of having a user-focused, warfighter-friendly, spectral imagery system that integrates spectral information into the ground and Joint Forces C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance) architecture. The assessment examined the effectiveness of tasking, collecting, processing, exploiting, and disseminating intelligence information related to the use of spectral information.

Spectral information proved to be an advanced enabler that enhanced battlespace knowledge for the ground component and Joint Forces. Benefits included improvements in situational awareness,

Battle Captain ... from Page 35

but invaluable tool that the battle captains maintained daily in order for the SSE to support the Army Forces in accomplishing its mission and finish decisively.

Finally, the battle captains conducted numerous other duties that enhanced the SSE's ability to accomplish its mission. The battle captains assisted the team leader in briefing the rest of the SSE on battle updates and in ensuring that everyone knew their place in the common operating picture. Battle captains also conducted the shift changeover brief. This brief updated the incoming SSE shift on all significant activities that had occurred during the last shift. The last task of the day for the battle captains was to write and submit the situational report to the Army Space Operations Center. Battle captains performed these tasks because they usually had the best grasp on the battlefield situation and the most information on what everyone was working on in the SSE.

In summary, ARSST 5 was given the mission to enable the Objective Force to see first, understand first, decide first, and then act decisively. In order to accomplish this mission, ARSST 5 had to transition to become a Space Support Element and learn new and different ways of supporting the warfighter. One of the new duty positions created by the SSE was the battle captain position. They proved invaluable in helping to set up this transition and then in managing the enormous amounts of information that the SSE received during MC02. Valuable insight was gained by the battle captains that helped determine future requirements for Space support elements based on the lessons they learned during MC02.

CPT Bob Barrett is the operations officer for Army Space Support Team 5 and currently serves in Kuwait in support of Operation Enduring Freedom. He served two years at Fort Hood, Texas, as a platoon leader in B/2-7 CAV and a member of brigade staff in 3BDE, 1st Cavalry Division, before joining U.S. Army Space Command.

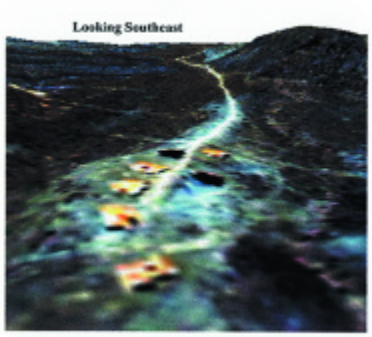
1LT Angela Johnson is the communications officer for Army Space Support Team 5 and currently serves in Kuwait in support of Operation Enduring Freedom. She was enlisted in the Minnesota Army National Guard for six years prior to accepting an active duty commission. She served for one year as the executive officer for A Company 122D Signal Battalion on Camp Red Cloud, Korea, before joining U.S. Army Space Command.

common operating picture, military decision-making process, intelligence cycle, targeting, and battle damage assessment. Such improvements yield information superiority, and help enable the agile decision making required to conduct rapid decisive operations, seize the initiative, maintain momentum, and exploit success. Initial results of the MC02 experience indicate that spectral information can enable Army transformation by improving the information superiority of an extended, light and fast ground force.

Figure 4

Spectrally Analyzed Ikonos Image, Showing Military Equipment

Figure 5



Perspective View of Limaville Site

John McMurray is the spectral imagery program manager at L-3Com Analytics Corporation and supports Army Space and Missile Defense Command in Colorado Springs, Colo. Retiring from the Army in 1995, he served as Senior Engineer for the Sinai Peacekeeping Force and as Director of Current Operations for Army Space Command. He performed Army demonstrations of Global Broadcast Service, and coordinated ground operations for the Air Force Research Lab Warfighter-1 hyperspectral satellite program.

Russ Robinson serves in the Concepts and Initiatives Division of the U.S. Army Space and Missile Defense Battle Lab in Colorado Springs, Colo. A Vietnam veteran, aircraft maintenance officer, and rotary wing aviator who retired from the Army in 1992, he also served as Assistant Program Manager in the Aircraft Survivability Equipment Program Office and the Apache Program Office, as Operational Test Officer in OTEA and as an International Research & Development Coordinator in Germany.

MC02 allowed U.S. Space Command to show to the rest of the military how Space/CNO/IO are crucial to achieving desired effects on the modern digital battlefield.

Joint Space Support ... from Page 37

nating in the main exercise. This process gave the SIOE members a chance to test various procedures to get a feel for what worked and what needed improvement. Between the spirals, the SIOE team members refined their procedures and then went into the main exercise with a better idea of the path they needed to take to be successful.

Part of the experiment of MC02 was to have all the major components (air, land, maritime, special operations, psychological operations, and the JTF) geographically separated. The components still were able to carry out planning and synchronization of efforts by using collaborative planning. The collaboration was done by using Info Work Space.

Since the SIOE had some of its members geographically separated, the Info Work Space was instrumental in allowing the SIOE to complete its mission. Using the Info Work Space and e-mail allowed the SIOE members at the components, the JTF, and reachback cell to stay in real-time contact for more effective synchronization. The Info Work Space also allowed the Army Space Command Space Support Element (SSE) located at Fort Bragg, N.C., to communicate in real time with all of the other Space players participating in MC02.

The Info Work Space is a series of servers and workstations designed to produce a virtual office environment. There are meeting rooms, file cabinets, white boards, etc. Everything found in a normal office building is accessible. This allows geographically separated components, or in this case the SIOE, to do collaborative planning. All one has to do to have a meeting is pick a room and a time and notify the desired participants. The attendees can talk back and forth, share slides, and use a white board to demonstrate concepts. Info Work Space allowed the components and the JTF to plan in parallel. This parallel planning produced for a greatly reduced planning cycle. Any difference between the overall JTF campaign plan and the component's plan for execution could be quickly ironed out in real time using Info Work Space. This successfully demonstrated that the need for all of the components to be collocated could be eliminated.

U.S. Space Command developed an assessment plan for MC02. This plan was used to document lessons learned and shortfalls in techniques, tactics, and procedures; highlight the successful areas; and assess the overall success of the SIOE concept. As with any new concept, its testing produces necessary refinements and modifications. While the assessment plan designated some changes in the way SIOE support is provided, but U.S. Space Command determined that the SIOE concept added greatly to the JTF staff and the success of MC02 operations.

So how does this impact the Functional Area (FA) 40/SSE in the field? By design, the SIOE will provide a focal point across the JTF for the coordination of Space activities and information. The SIOE will be the conduit for the FA 40/SSE to comprehend the strategic plan for the employment of Space/IO assets in support of effects-based operations. Any questions, concerns, or ideas that the FA 40/SSE may have about the Space/IO campaign will be directed to the SIOE.

Senior mentors and senior experiment officials agreed that Space/CNO/IO are combat multipliers and will be in great demand in future operations. MC02 provided a good starting point for U.S. Space Command forces as they plan for support in future real-world operations and participation in future series of experiments. MC02 allowed U.S. Space Command to show to the rest of the military how Space/CNO/IO are crucial to achieving desired effects on the modern digital battlefield.

Matt Scott serves as an action officer in G-3 Plans, Space Branch, Army Space Command. His professional experience includes satellite command and control operations for Lockheed Martin Technical Operations on several different satellite systems and seven years as an Air Force Space Operations Officer in the missile warning and Space surveillance fields.

Our participation in MC02 underscored the importance of experimentation, and that to be relevant, we must remain active in future Joint experimentation. ...

PHOTO COURTESY U.S. ARMY

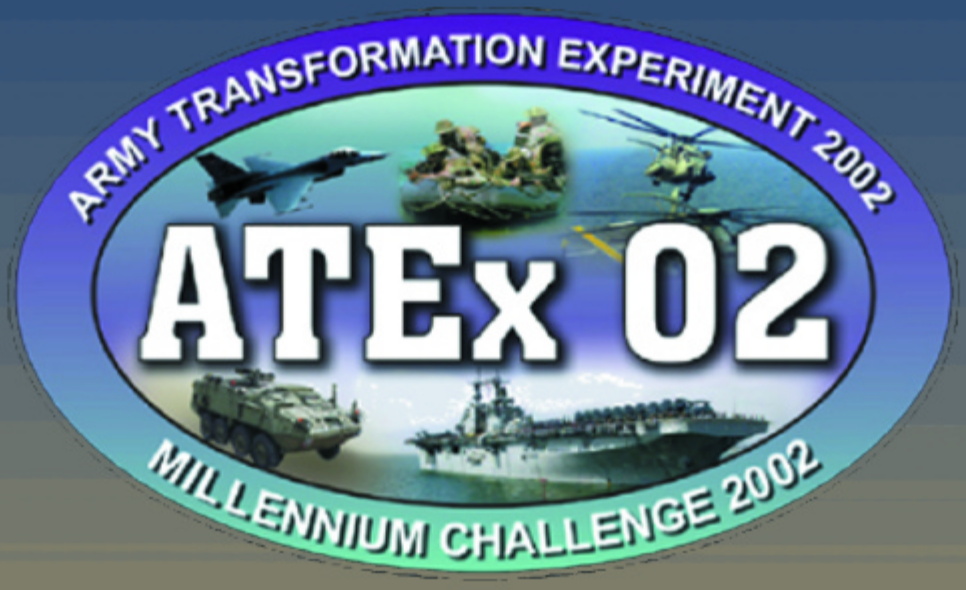
***Above:** A Stryker combat vehicle goes through its paces. The Stryker was one of many pieces of equipment involved in MC02.*

MC02 showed that Space expertise and Space-based capabilities have a key role in enabling the Objective Force as a part of Joint operations.

— BG Richard V. Geraci

Through experiments such as Millennium Challenge 2002 (conducted from July 24 to Aug. 15), we are able to demonstrate and assess the "values-added" of innovative capabilities and new operational concepts.

— LTG Joseph M. Cosumano Jr.



Army Transformation Experiment 2002 was an Army segment of the larger joint experiment Millennium Challenge 2002, held at Fort Bragg, N.C. In the next issue of the Army Space Journal, we will focus on the Army's Transformation and the role Space will play within it.

UPCOMING JOURNAL THEMES

Winter 2003 — "The Role of Space in Army Transformation"
Spring 2003 — "The Army's Future in Space"
Summer 2003 — "Space Technology — Where is it Leading Ground Forces?"
Fall 2003 — "Focus on Space Operations"